

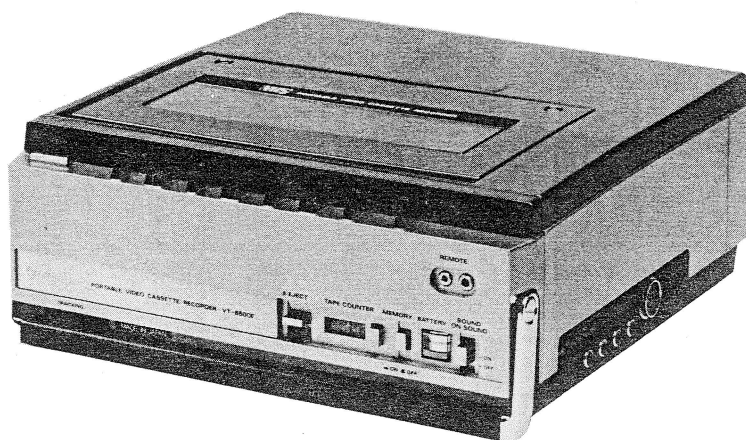
HITACHI **SERVICE MANUAL**

TK

No. 1587E

VT-6500E
VT-TU65E
A-V60E

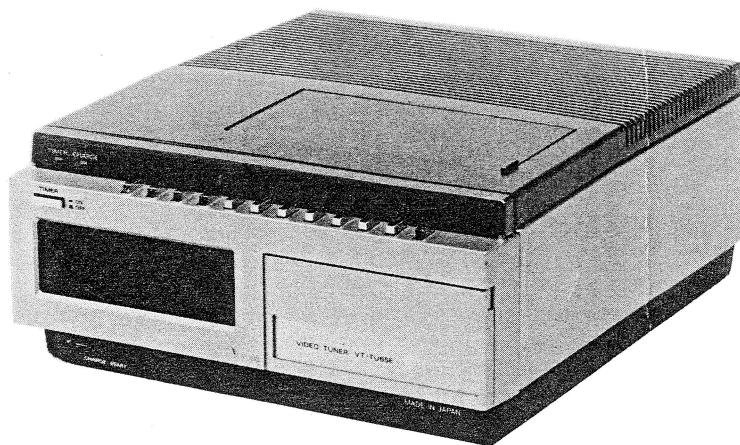
Technical Data



VT-6500E



A-V60E



VT-TU65E

VHS

**THIS VIDEO DECK IS A
VHS TYPE VIDEO RE-
CORDER.
FOR PROPER OPERA-
TION, ONLY THE VHS
TYPE CASSETTE MUST
BE USED.**

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

PORTABLE VIDEO DECK-VIDEO TUNER-POWER ADAPTOR

July 1981

TOKAI WORKS

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A-V60E	150		
Total Assembly	150		

SAFETY PRECAUTION

The following precautions should be observed when servicing.

1. Since many parts in the unit have special safety related characteristics, always use genuine Hitachi's replacement parts.

Especially critical parts in the power circuit block should not be replaced with other makers.

Critical parts are marked with  in the schematic diagram and circuit board diagram.

2. Before returning a repaired unit to the customer, the service technician must thoroughly test the unit to ascertain that it is completely safe to operate without danger of electrical shock.

SPECIFICATIONS

Format :	VHS PAL Standard
Cassette :	VHS Type 60 min. 120 min. 180 min.
Recording :	Rotary Two Head Helical Scan Azimuth Recording
Tape Speed :	23.39 mm/sec.
Tape Width :	12.7 mm
Operation Temperature :	0°C to 40°C
Video :	PAL colour & CCIR monochrome signals 625 lines
Recording Time :	240 min. (with Hitachi E-240 cassette)
RF Output :	UHF channels 37 (30—39 adjustable)
Video Input :	0.5 to 2.0V p-p 75 ohm Unbalanced
Video Output :	1V p-p 75 ohm Unbalanced
S/N Ratio (Video) :	43 dB
S/N Ratio (Audio) :	43 dB
Horizontal Resolution :	Colour 240 lines
Mic Input :	—69 dB 1 Kohm
Audio Input :	—20 dB 50 Kohm
Audio Output :	—6 dB 500 ohm
Audio Frequency Range :	70 Hz to 12 kHz
Power :	DC 12V
Power Consumption :	5.5W Nominal (recording with DC 12V power supply)
Cabinet Size :	263 mm(W)×108 mm(H)×257 mm(D)
Weight :	4.9kg (including Battery Pack VT-BP60E)

VT-TU65E-TUNER

Video Signal :	PAL colour Signal
Antenna (aerial) input	UHF 75 ohms
Power Consumption :	60W
Channel Received :	UHF channels 21—69 (For the United Kingdom) UHF channels 21—69 VHF channels 2—12 (Except for the United Kingdom)
RF Out put :	UHF 75 ohms
Power Supply :	AC 100—110V/115—127V/200—220V/230—250V (For the United Kingdom) AC 200—220V (Except for the United Kingdom) 50 Hz/60 Hz (For the United Kingdom) 50 Hz (Except for the United Kingdom)
Dimensions :	108(H)×230(W)×265(D)mm
Weight :	4.2kg

A-V60E-ADAPTOR

Antenna (aerial) input :	UHF 75Ω
RF Output :	UHF 75Ω
Operation Temperature :	0°C to 40°C
Power Supply :	AC 100—120V/200—240V 50/60 Hz
Power Consumption :	48W
Dimensions :	140(W)×108(H)×264(D)mm
Weight :	3kg

KEY TO ILLUSTRATIONS

VT-6500E

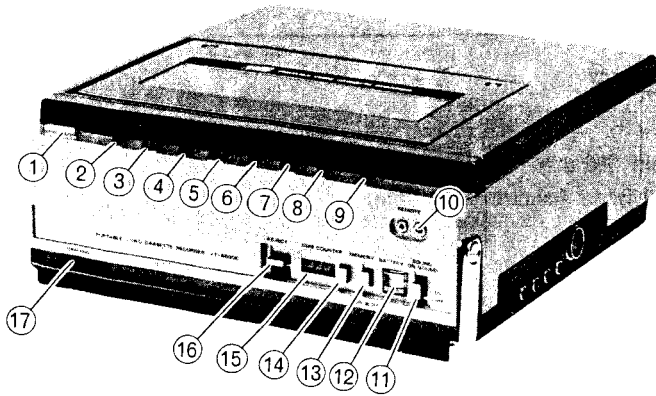


Fig. 1 Front view

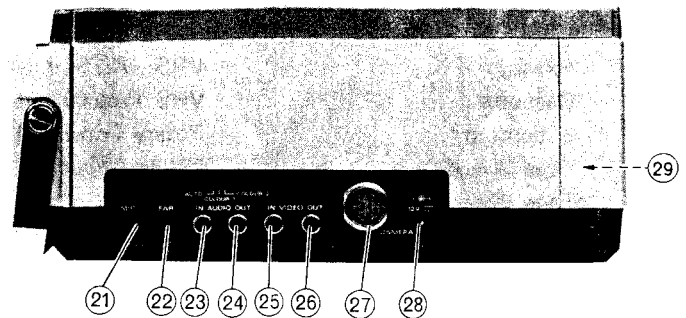


Fig. 2 Side view

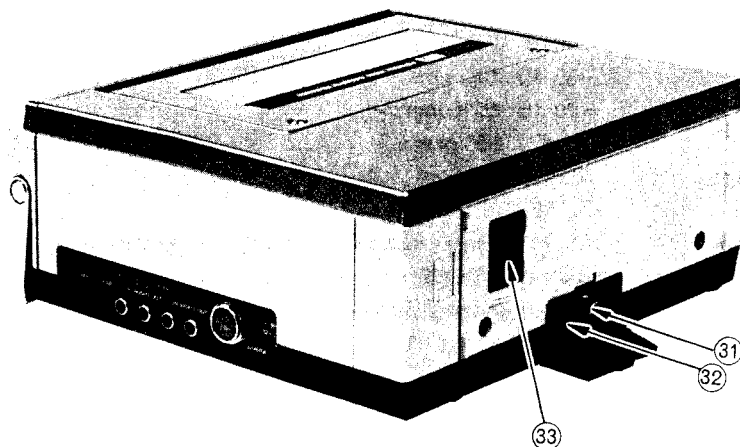


Fig. 3 Rear view

Front

1. Operate switch
2. Audio Dub button
3. Record button (REC)
4. Rewind button (REW)
5. Play button (PLAY)
6. Fast Forward button (F.F)
7. Stop button (STOP)
8. Pause button (PAUSE)
9. INSERT button
10. Remote control jack
11. Sound on sound switch
12. Battery meter
13. Memory switch
14. Counter reset button
15. Tape counter
16. Eject lever
17. Tracking adjustment knob

Side

21. Mic jack
22. Earphone jack
23. Audio input jack
24. Audio output jack
25. Video input jack
26. Video output jack
27. Camera jack
28. External battery jack
29. Internal battery jack

Rear

31. RF output jack
32. Tuner/adaptor jack
33. RF converter TSG switch

VT-TU65E

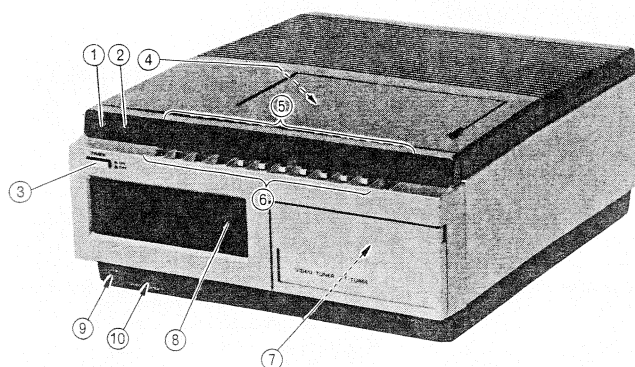


Fig. 4 Front view

Front

1. Timer indicator
2. Internal battery charging indicator
3. Power/Timer switch
4. Channel preset
5. Channel indicator
6. Channel select button
7. Timer section
8. Timer display
9. Aux. battery charge jack
10. Charge start switch

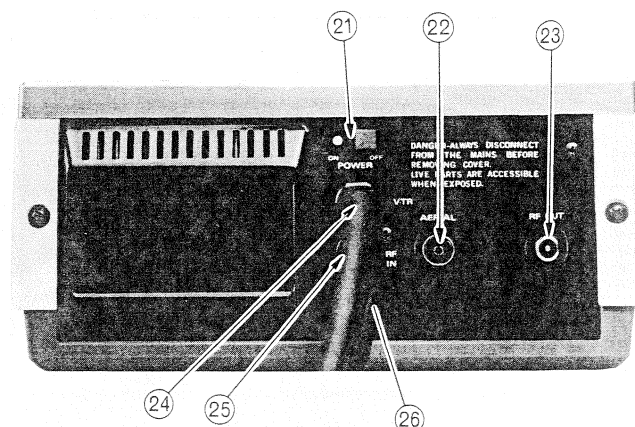


Fig. 5 Rear view

Rear

21. Power switch
22. Aerial jack
23. RF output jack
24. VTR connection cord (10P DIN cord)
25. RF cord
26. Power cord

A-V60E

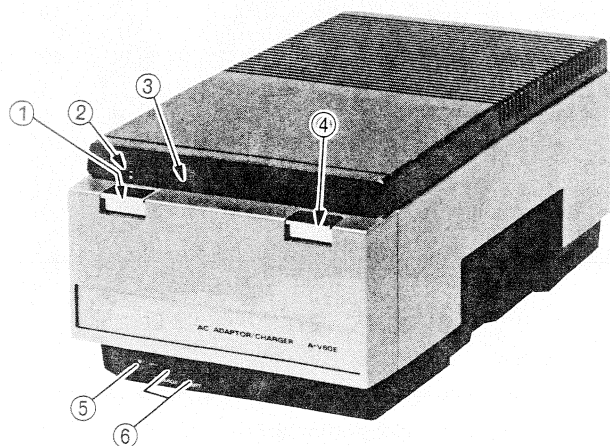


Fig. 6 Front view

Front

1. Power switch
2. Power indicator
3. Internal battery charging indicator
4. TV/VTR output select switch (TV/VTR switch)
5. Aux battery charge jack
6. Charge start indicator/charge start switch

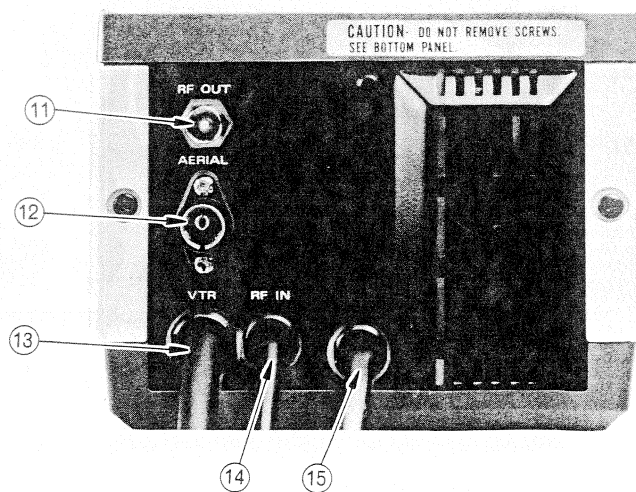


Fig. 7 Rear view

Rear

11. RF output jack
12. Aerial jack
13. VTR connection cable (14P DIN cord)
14. RF cord
15. Power cord

DISASSEMBLY

VT-6500E

1. Main mechanical parts arrangement plan

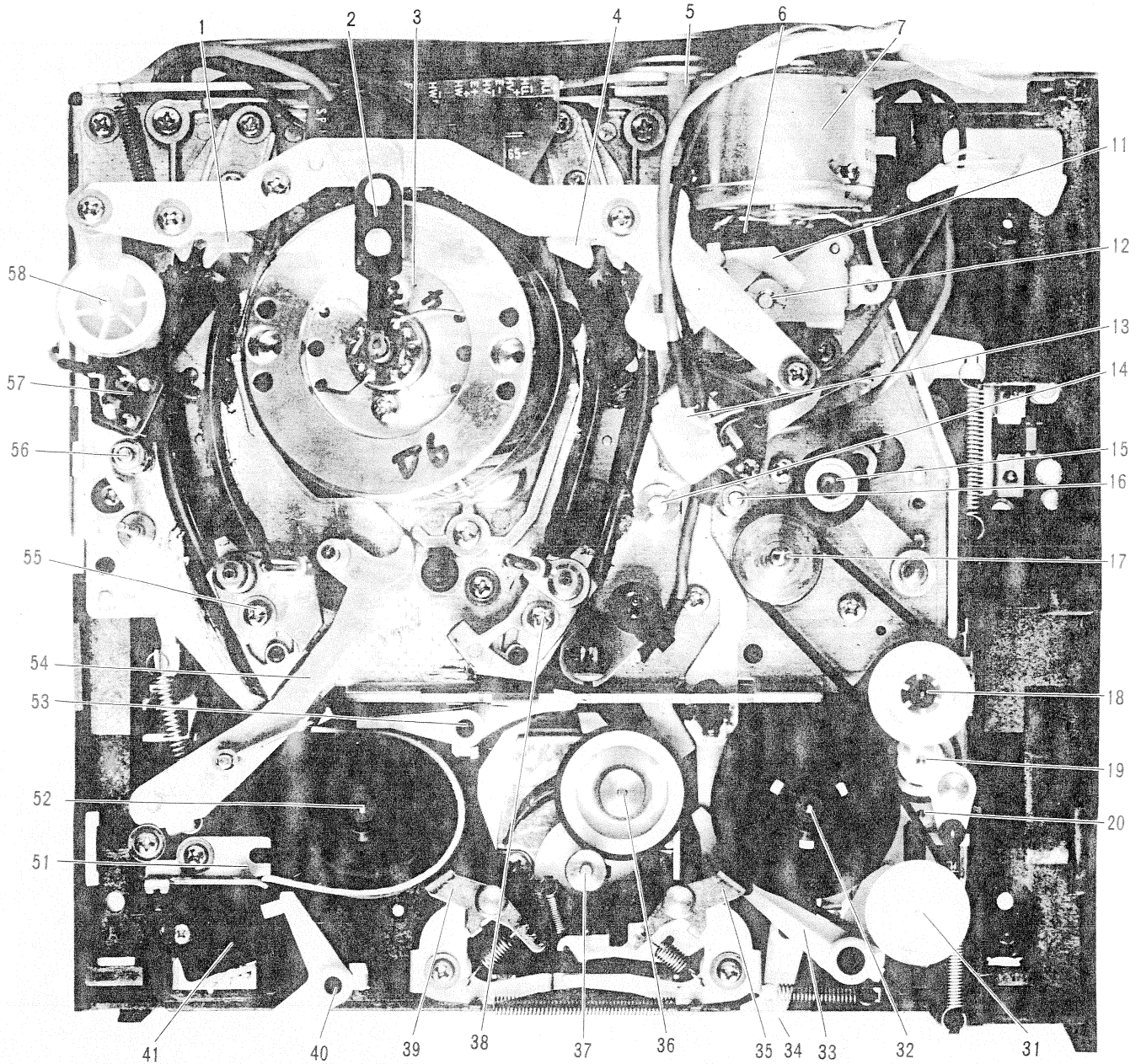


Fig. 8 Top view

1. Catcher (Supply)
2. Cylinder motor GND piece
3. Cylinder
4. Catcher (Take-up)
5. Brake pulley
6. Barake operation mechanism
7. Loading motor

11. X value operation arm
12. Slow X value adjusting screw
13. AC head (Audio/control head)
14. X value adjusting screw
15. Pressure roller
16. Guide pole (Take-up)
17. Capstan
18. Take-up pulley
19. Play idler
20. Take-up brake

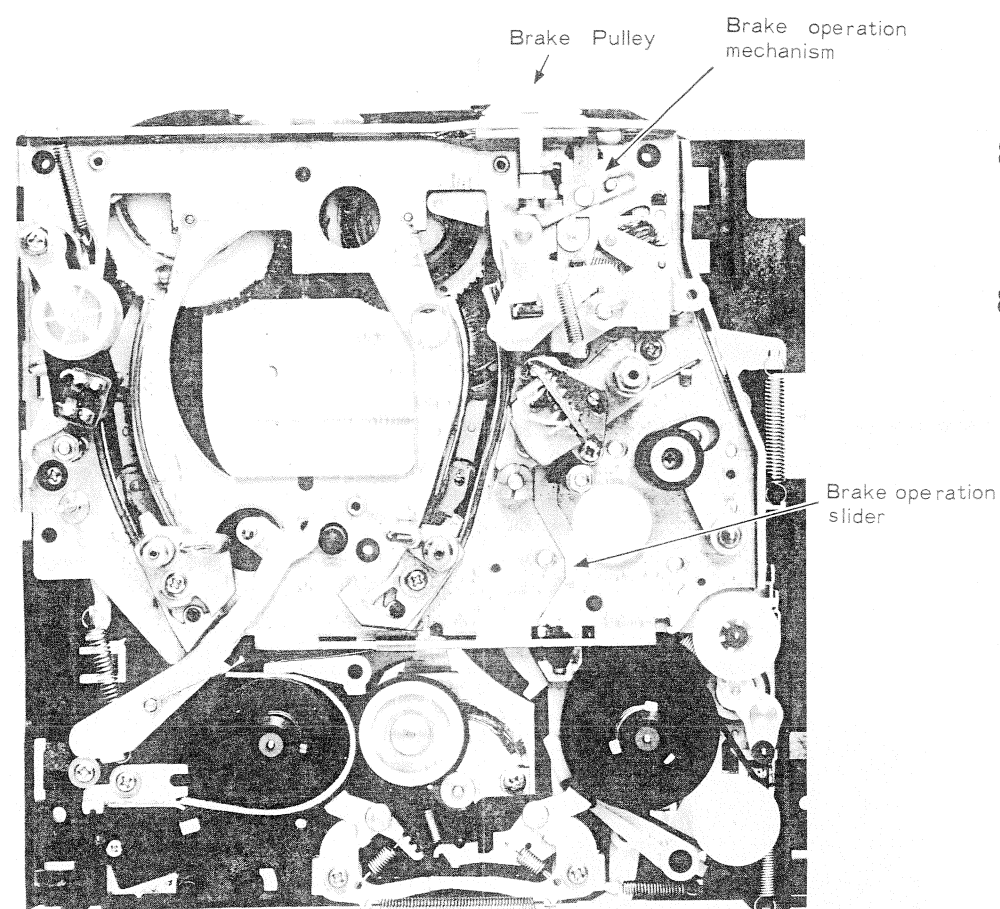


Fig. 9 Top view of brake operation mechanism

- 31. Counter pulley
- 32. Reel disk (Take-up)
- 33. FF/REW idler release lever
- 34. Eject prevention tab
- 35. Main brake (Take-up)
- 36. FF/REW idler
- 37. Reel motor pulley
- 38. Guide roller base (Take-up)
- 39. Main brake (Supply)
- 40. Safety tab lever
- 41. Safety tab switch

- 51. Tension band
- 52. Reel disk (Supply)
- 53. Supply brake
- 54. Tension arm
- 55. Guide roller base (Supply)
- 56. Guide pole (Supply)
- 57. FE head (Full erase head)
- 58. Impedance roller (Supply)

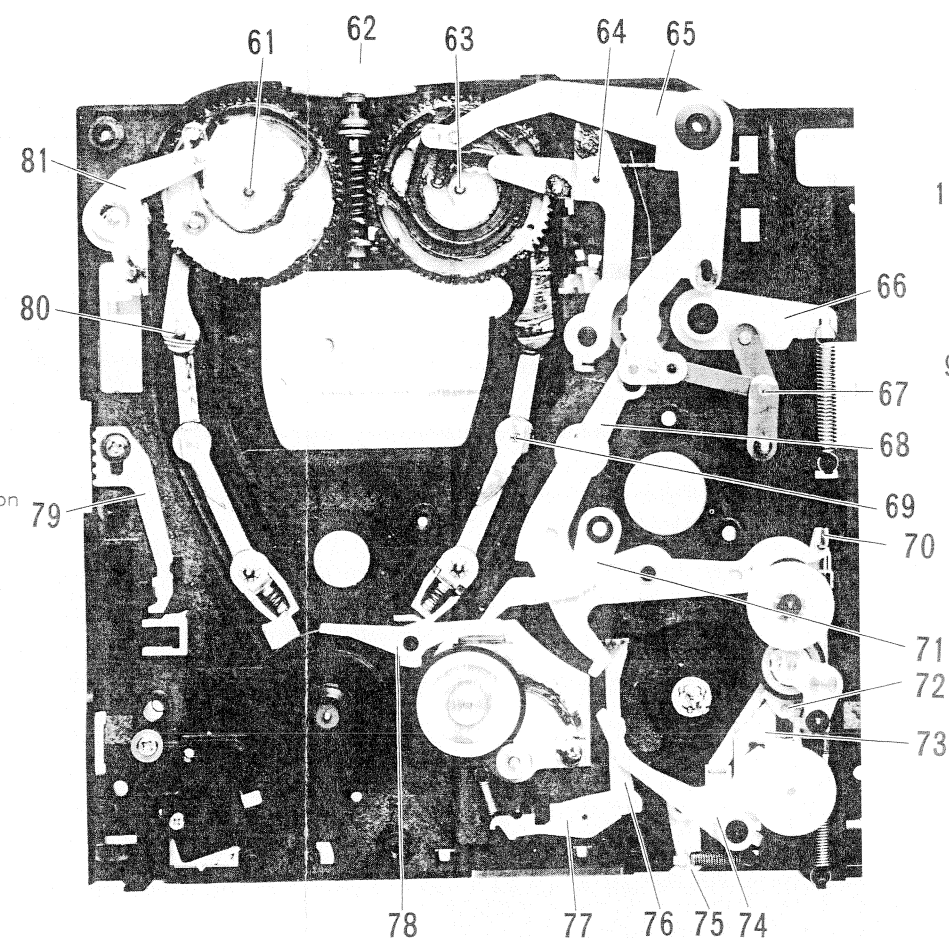


Fig. 10 Slider/lever arrangement plan

- 61. Loading gear (Supply)
- 62. Worm gear pulley
- 63. Loading gear (Take-up)
- 64. Switch operation arm
- 65. Drive arm A
- 66. Pressure roller compression arm
- 67. Pressure roller drive link
- 68. Drive arm B
- 69. Three-connection link (Take-up)
- 70. Operation slider B
- 71. Supply brake operation arm
- 72. Take-up brake
- 73. Operation slider A
- 74. FF/REW idler release lever
- 75. Eject preventive tab
- 76. Main brake operation slider
- 77. Main brake operation arm
- 78. Supply brake
- 79. Tension spring holder
- 80. Three-connection link (Supply)
- 81. Impedance roller drive arm

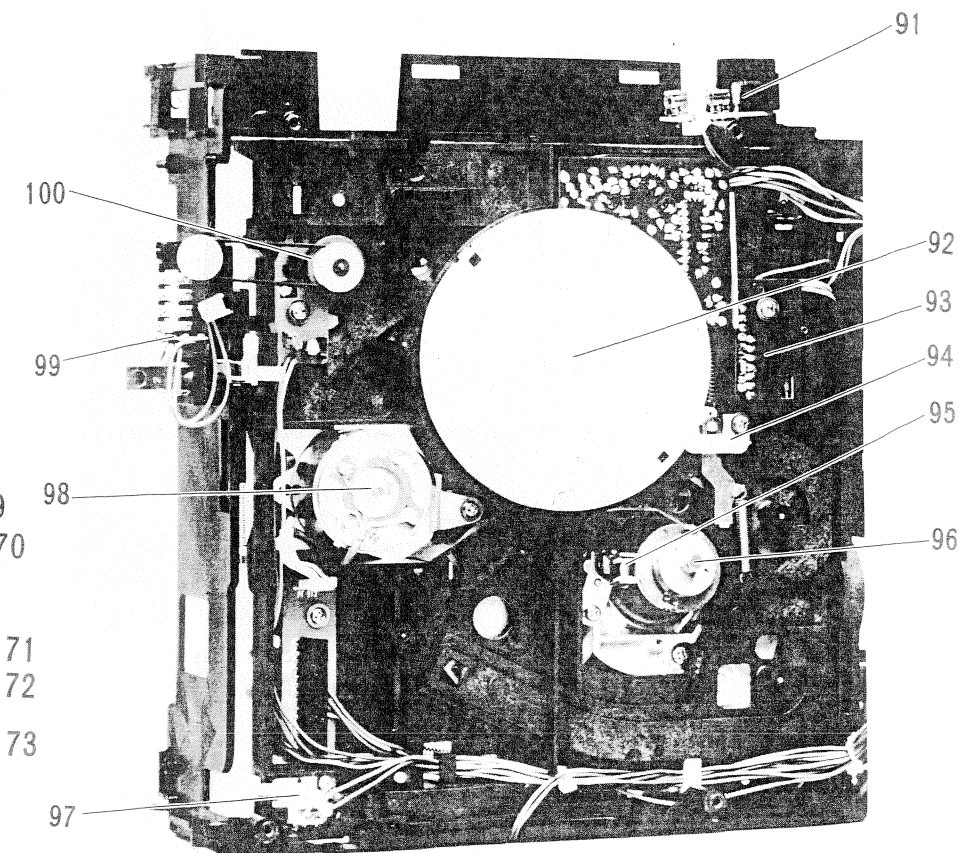


Fig. 11 Bottom view

- 91. Internal battery jack
- 92. Capstan motor
- 93. Mechanical state sensor switch
- 94. Slow brake
- 95. Cylinder tach head
- 96. Cylinder motor
- 97. Cassette holder switch
- 98. Reel motor
- 99. Tape counter
- 100. Reel sensor magnet (Counter pulley)

2. PC Board arrangement plan

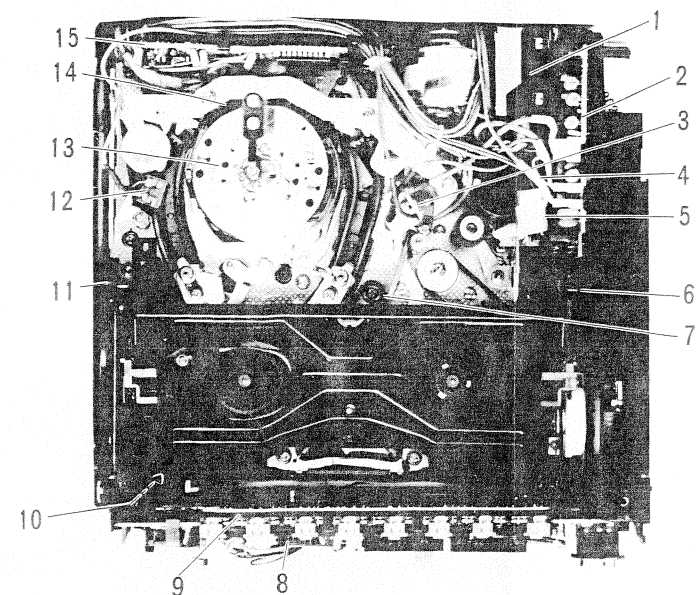


Fig. 12 Top view

1. RF converter
2. Audio
3. AC head
4. Loading motor driver
5. Dew sensor
6. End sensor (Take-up)
7. End lamp
8. System control
9. Operation switch
10. Safety tab switch
11. End sensor (Supply)
12. Full-erase head
13. Video head
14. Cylinder motor driver
15. Cylinder motor

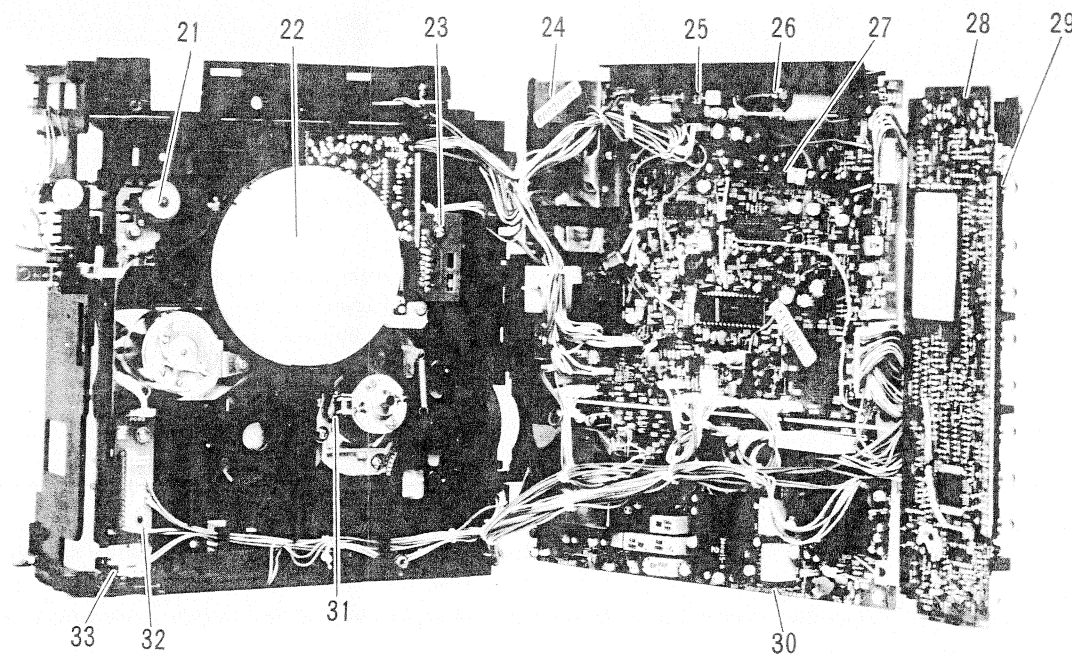


Fig. 13 Bottom view

- | | |
|------------------------------------|----------------------------|
| 21. Reel sensor | 28. System control |
| 22. Capstan motor | 29. Operation switch |
| 23. Mechanical state sensor switch | 30. Luminance/Chroma |
| 24. Switching regulator | 31. Cylinder tach head |
| 25. Sound-on-sound | 32. Reel motor driver |
| 26. Camera connector | 33. Cassette holder switch |
| 27. Servo | |

3. Removing the case

1. Top cover (Fig. 14)

- 1) Remove 2 screws.
- 2) Lift up the cassette holder.
- 3) Lift up the rear section a little and pull it backward.

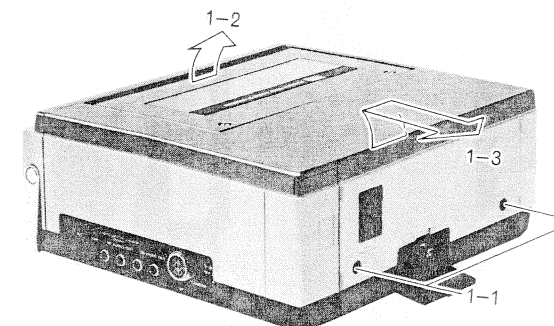


Fig. 14

2. Bottom cover (Fig. 15)

- 1) Remove 4 screws.

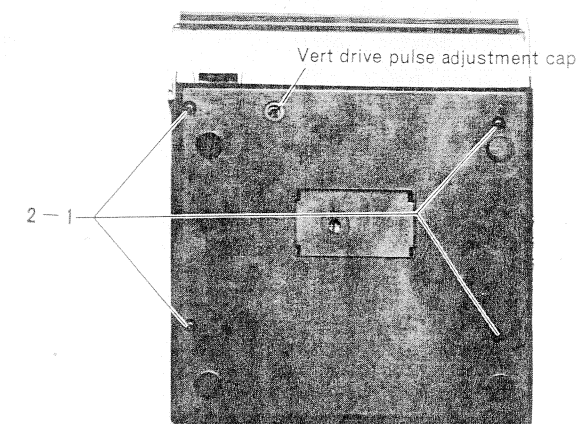


Fig. 15

3. Front cover (Fig. 16)

- 1) Remove 2 screws.
- 2) Remove 2 screws.
- 3) Hold 2 hinges and lift the cover up.

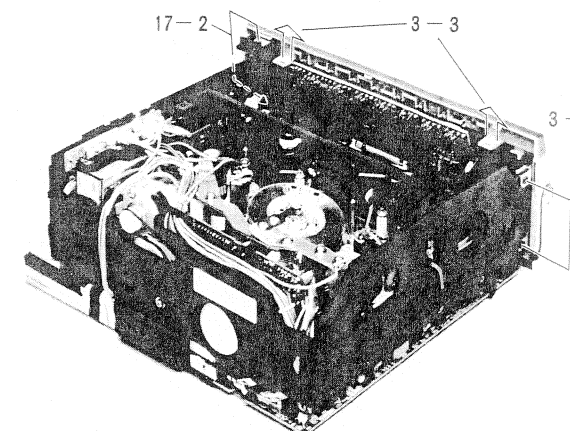


Fig. 16

4. Removing the main mechanical parts

1. Reinforcement plate.
2. Cassette holder Motor, etc.
3. Cylinder/cylinder base
4. Loading motor
5. Capstan motor
6. Reel motor Pulley, etc.
7. FF/REW idler
8. Impedance roller
9. Pressure roller
10. Take-up pulley
11. Play idler
12. Counter pulley
13. Reel disk
14. Slow brake Others
15. Main brake
16. Tension arm/tension band
17. Guide roller base/Inclined guide
18. Sub. chassis
19. Loading gear
20. Frame

1. Reinforcement plate (Fig. 17)

- 1) Remove 4 screws

2. Cassette holder (Fig. 17)

- 1) Lift up the cassette holder.
- 2) Remove the safety tab switch lever.
- 3) Remove 2 screws.

Pay attention to the following when assembling the cassette holder. If it is not done correctly, the cassette holder will not operate properly after assembly. Set the cassette holder up when assembling.

1. The cassette eject arm should be on the right of the eject prevention tab when unloading is complete.
2. The synchronization plate of the cassette holder should enter between the cassette eject arm and the frame.

When the eject arm at the front of the frame is pulled toward you with the servo PC Board kept open when mounting the holder, the synchronization plate easily enters between the eject arm and the frame.

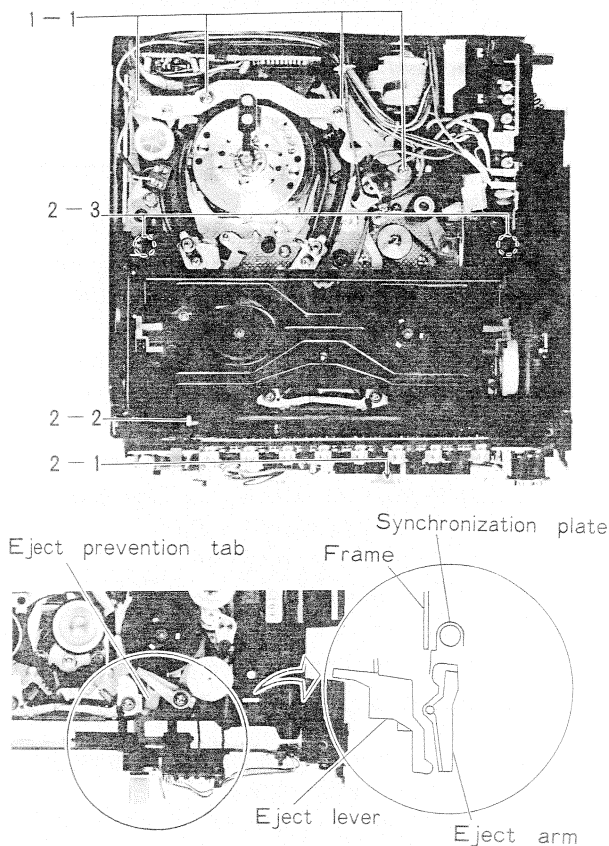


Fig. 17

3. Cylinder/cylinder motor (Fig. 18)

- 1) Remove the cord clammer from the frame, and then remove the connector between the video head and Luminance/Chroma PC Board.
- 2) Pull out the cylinder motor driver PC Board.
- 3) Remove 3 screws to remove the cylinder motor together with the base.
- 4) Remove 3 screws to separate the base and the cylinder motor from each other.

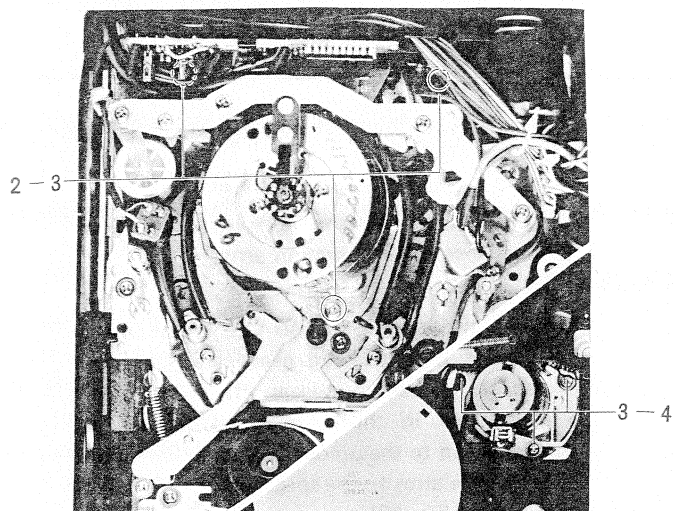


Fig. 18

4. Loading motor (Fig. 19)

- 1) Remove the connector between the loading motor and the loading motor driver PC Board.
- 2) Remove one screw.

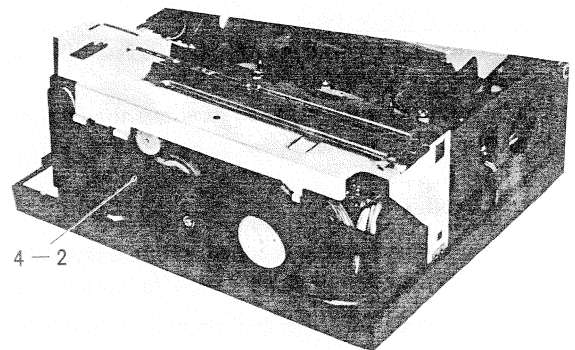


Fig. 19

5. Capstan motor (Fig. 20)

- 1) Open the servo PC Board.
- 2) Remove the connector between the capstan motor and the servo PC Board.
- 3) Remove the belt.
- 4) Remove 3 screws.

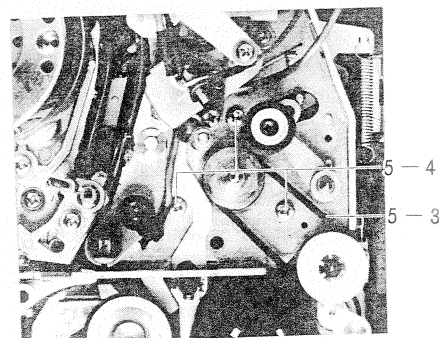


Fig. 20

6. Reel motor (Fig. 21)

- 1) Remove the connector.
- 2) Remove one screw.
- 3) Move the FF/REW idler so that it does not touch the chassis and the supply brake, and pull out the brake.

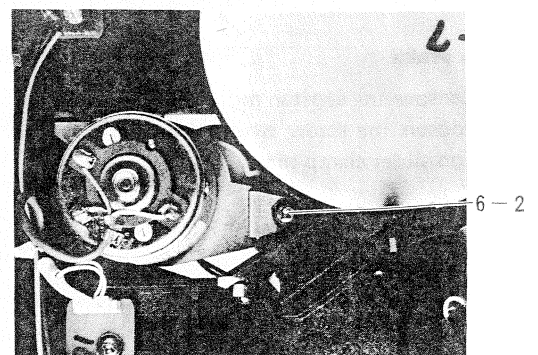


Fig. 21

7. FF/REW idler

- 1) Remove the reel motor.
- 2) Loosen the hexagonal screw which holds the motor shaft.

8. Impedance roller

- 1) Remove the reinforcement plate, and pull the roller out from the shaft.
Make sure that the roller shaft enters the U-groove of the impedance roller operation arm during assembly.

9. Pressure roller

- 1) Remove one screw inside the pressure roller.
Assemble the pressure roller with the section provided with the plastic inner wheel top.

10. Take-up pulley

- 1) Remove the washer from the take-up pulley shaft.
- 2) Remove the capstan belt and pull the pulley out of the chassis.

11. Play idler

- 1) Remove the take-up pulley.
- 2) Remove the washer from the play idler ass'y shaft.
- 3) Remove the spring between the play idler ass'y and the sub. chassis.

Check that the take-up brake shaft enters the groove just before the operation slider B, and that the play idler shaft enters the front groove during assembly.

12. Counter pulley

- 1) Remove the washer attached to the reel sensor magnet shaft at the bottom of the chassis.
- 2) Pull out the pulley upward.

13. Reel disk

- 1) Remove the washer from the reel disk shaft.
In the case of the take-up reel disk
- 2) Remove the counter pulley belt and remove the disk from the shaft.
In the case of the supply reel
- 3) Remove the tension band.
- 4) Pull out the supply brake.
- 5) Pull out the reel disk.

14. Slow brake

- 1) Remove the capstan motor.
- 2) Loosen the screw which fixes the slow brake operation slider clamp plate.

15. Main brake

- 1) Remove the brake clamp screw.

16. Tension arm/tension band (Fig. 22)

- 1) Remove the spring between the sub. chassis and the tension arm.

- 2) Remove the tension arm clamp screw.
- 3) Remove the band holder fixing screw.

17. Guide roller base/inclined guide

Guide roller base

- 1) Remove the sub. chassis.
- 2) Remove the leaf spring clamp screw.

Inclined guide

- 1) Remove the screw at the top of the guide roller base.
- 2) Pull out the inclined guide together with the base taking care to prevent it from touching the guide roller.

18. Sub. chassis (Fig. 22)

- 1) Remove the cassette holder.
- 2) Remove the loading motor.
- 3) Remove the cylinder base (to protect the video head)
- 4) Remove the capstan motor.
- 5) Remove the tension arm.
- 6) Remove 2 springs.
- 7) Remove 5 screws.

Pay attention to the following during assembly.

1. The brake operation mechanism shaft should enter the hole in the drive arm A.
2. The X value operation arm drive lever should not touch the slow brake.
3. The pressure roller drive link and the pressure roller arm should be connected.
4. The impedance roller shaft should enter the U-groove of the impedance roller operation arm.
5. The brake operation slider of the chassis and the brake operation slider of the sub. chassis should be connected.
6. Both guide roller bases should be connected to the link.

Fix the sub. chassis after assembly paying attention to the above.

Perform loading and unloading manually while paying attention to the tab of the brake operation pulley to check that all the mechanism is normal, and then set the screws, springs and the tension arm.

19. Loading gear

- 1) Set the mechanism to the unloading complete condition.
- 2) Remove the sub. chassis.
- 3) Remove the drive arm A, switch operation arm and impedance roller operation arm.

During assembly:

1. Install the loading gear so that the triangular projections of both loading gears are symmetrical with respect to the worm gear shaft, and then turn the worm gear in the unloading direction to set the mechanism to the unloading complete condition.
2. Set all the arms to the specified positions.
(Refer to Fig. 10)

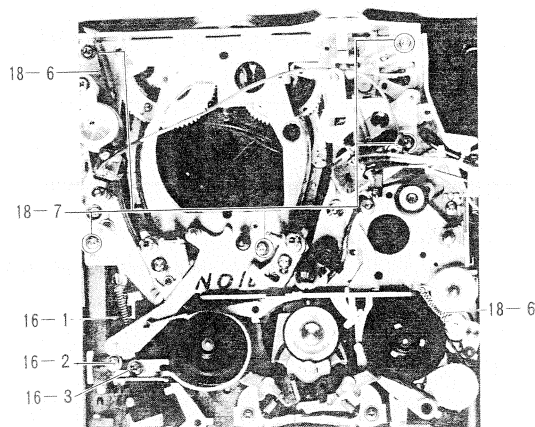


Fig. 22

20. Frame (Fig. 23)

- 1) Open the system control PC Board and Servo PC Board.
- 2) Remove the take-up end sensor from the frame.
- 3) Remove the audio PC Board.
- 4) Remove the cord clamber.
- 5) Cut 2 belts.
- 6) Remove 4 connectors of the Servo PC Board.
- 7) Remove the internal battery jack, reel sensor, relay belt, cassette holder switch, reel motor driver PC Board and supply end sensor.
- 8) Remove 3 frame fixing screws to pull the frame down.

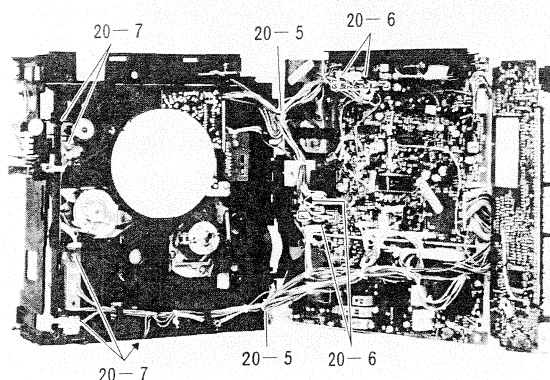
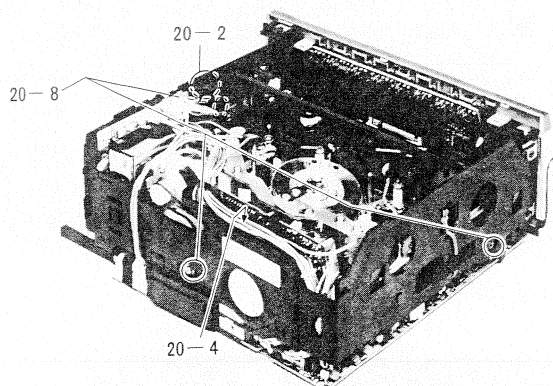


Fig. 23

5. Removing the main electric parts and PC Boards

Head

1. Upper cylinder
2. FE head
3. AC head
4. Tach head

PC Board

5. System control PC Board/operation switch PC Board
6. Servo PC Board/luminance/chroma PC Boards
7. Cylinder motor driver PC Board
8. Loading motor driver PC Board
9. Reel motor driver PC Board
10. Mechanical state sensor switch PC Board
11. Reel sensor PC Board
12. Sound-on-sound PC Board
13. Audio PC Board
14. RF converter
15. Switching regulator

1. Upper cylinder (Fig. 26)

- 1) Remove the cylinder motor GND piece.
- 2) Remove 4 leads over the cylinder.
- 3) Remove 2 screws.

2. FE head (Fig. 26)

- 1) Remove the reinforcement plate.
- 2) Remove 2 leads of the head.
- 3) Pull out the head together with the base from the chassis and remove 2 fixing screws at the bottom.

3. AC head (Fig. 26)

- 1) Remove the reinforcement plate.
- 2) Remove the nut.
- 3) Pull out the AC head together with the base paying attention to the spring.

4. Tach head (Fig. 25)

- 1) Open the servo PC Board.
- 2) Remove the tach head bracket fixing screw.
- 3) Remove 2 leads from the head.

5. System control PC Board/operation switch PC Board (Fig. 24)

- 1) Press 2 tabs in the directions of the arrows to open the PC Board.

6. Servo PC Board/Luminance/Chroma PC Board (Fig. 24)

- 1) Open the system control PC Board.
- 2) Press 2 tabs in the directions of the arrows to open the PC Board.

7. Cylinder motor driver PC Board

- 1) Pull out upward.

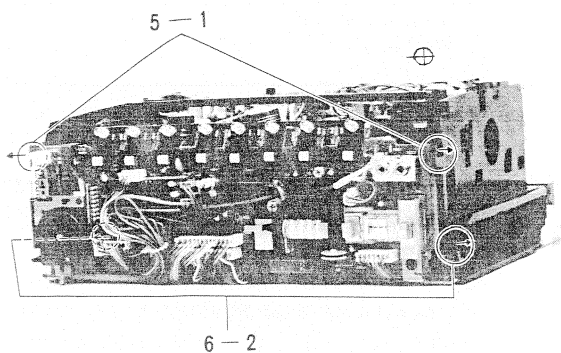


Fig. 24

8. Loading motor driver PC Board (Fig. 26)

- 1) Remove 1 screw.

9. Reel motor driver

10. Mechanical state sensor switch PC Board

11. Reel sensor PC Board

- 3 PC Boards mentioned above are fixed with 1 screw. (Fig. 25)

12. Sound-on-sound PC Board (Fig. 25)

- 1) Depress 2 tabs and pull out the PC Board in the horizontal direction.

13. Audio PC Board

- Pull out upward.

14. RF converter (Fig. 26)

- 1) Remove 1 screw.

15. Switching regulator (Fig. 25)

- 1) Open the servo PC Board.
- 2) Unsolder 3 positions soldered to the PC Board.

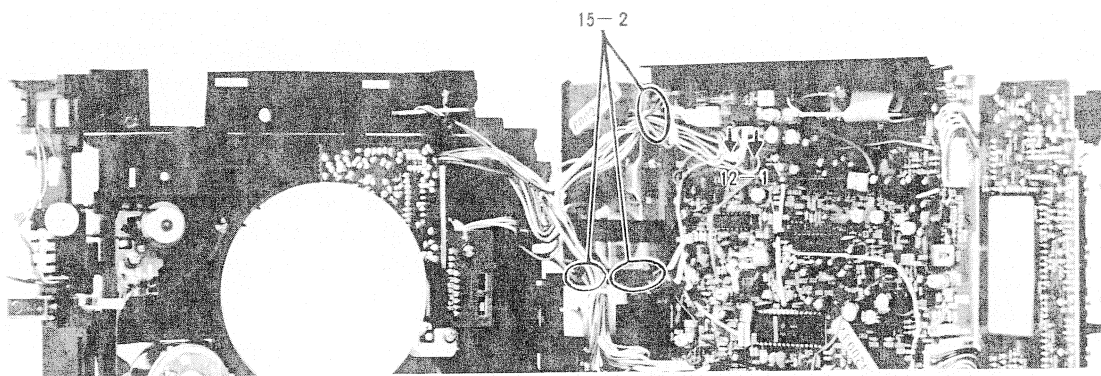


Fig. 25

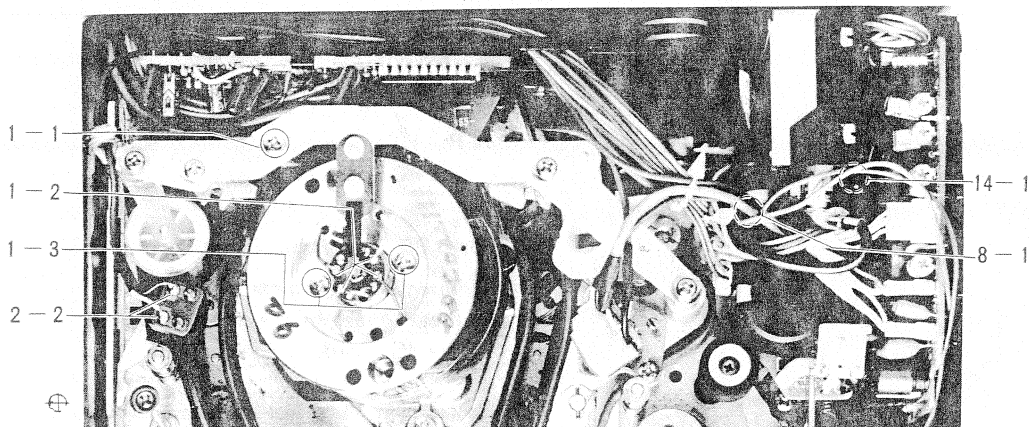


Fig. 26

VT-TU65E

1. PC Board arrangement plan

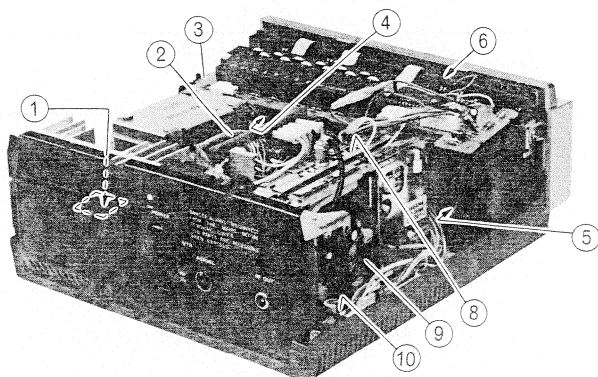


Fig. 27

- | | |
|---------------------|-----------------------------|
| 1. Power transistor | 7. Aux. battery charge jack |
| 2. Rectifier | 8. Tuner pack |
| 3. Channel selector | 9. IF pack |
| 4. Regulator | 10. Tuner IF |
| 5. Timer | 11. Switch |
| 6. Input key | |

2. Removing the case

1. Top cover

- 1) Remove 2 screws.
- 2) Lift up the rear and remove the top cover while pulling it back.

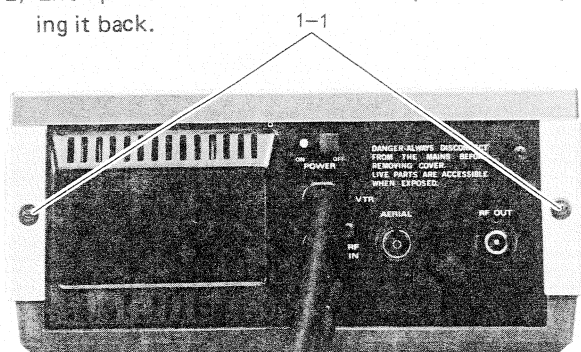


Fig. 28

2. Front cover (Fig. 29)

- 1) Remove the front (Fig. 30)
- 2) Remove 3 screws.

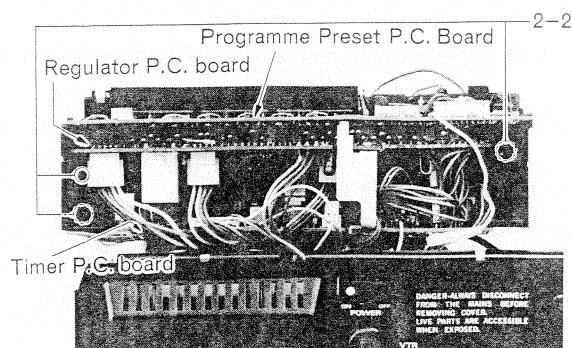


Fig. 29

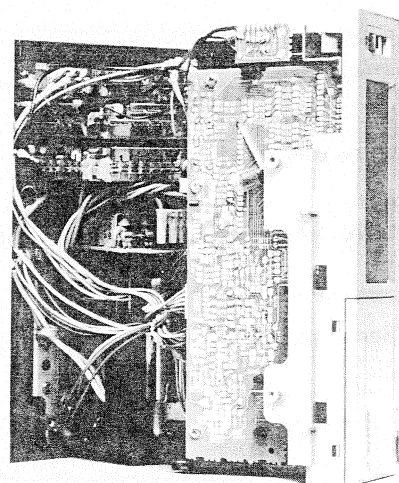
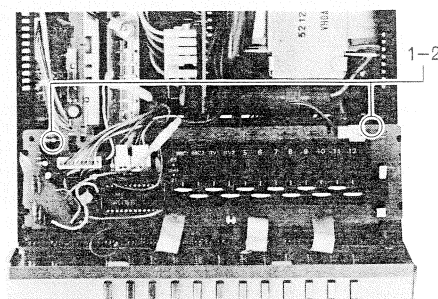
3. Removing the PC Boards

1. Regulator/timer/input key PC Board (Fig. 30)

- 1) Remove 2 screws from the bottom cover.
- 2) Remove 2 screws.

2. Tuner/IF PC Board (Fig. 31)

- 1) Remove 2 rear cover fixing screws.
- 2) Remove 3 aerial jack plate fixing screws.
- 3) Take out the tuner/IF block from the jack plate side together with the jack plate while pressing the rear cover backward. (Do not push it down)



(With front block removed)

Fig. 30

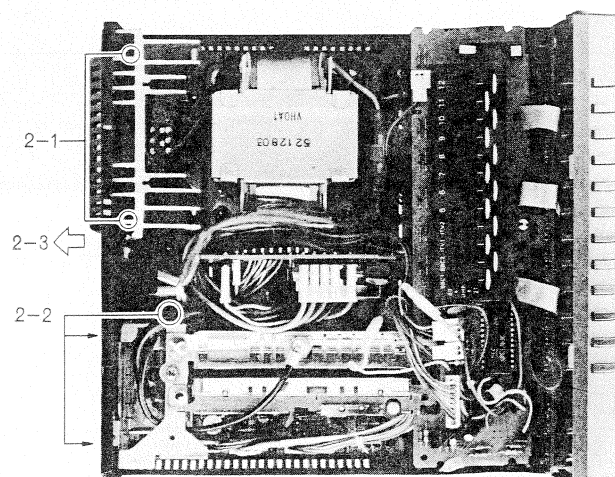


Fig. 31

A-V60A

1. PC Board arrangement plan

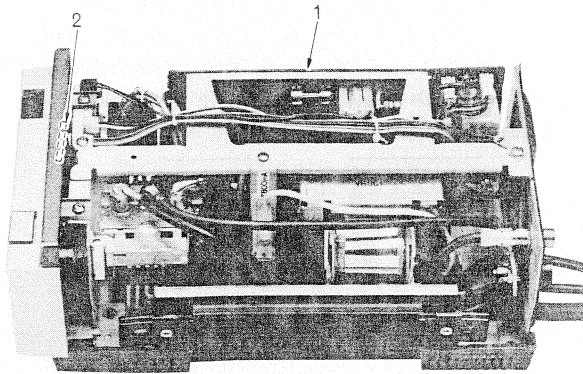


Fig. 32

- 1. Rectifier/Regulator
- 2. Aux battery charge jack

2. Removing the case

1. Top cover

- 1) Remove 2 screws of the rear cover.

2. Front cover (Fig. 32)

- 1) Remove 2 screws.

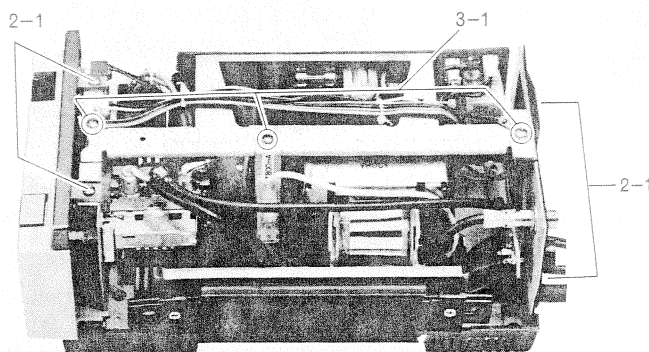


Fig. 33

3. Removing the PC Boards

1. Rectifier/Regulator

The above PC Boards are fixed each to the frame using 2 screws.

2. Aux battery charge jack PC Boards

- 1) Remove the Front cover
- 2) Remove the Bottom cover 4 screw
- 3) Remove the 2 screw

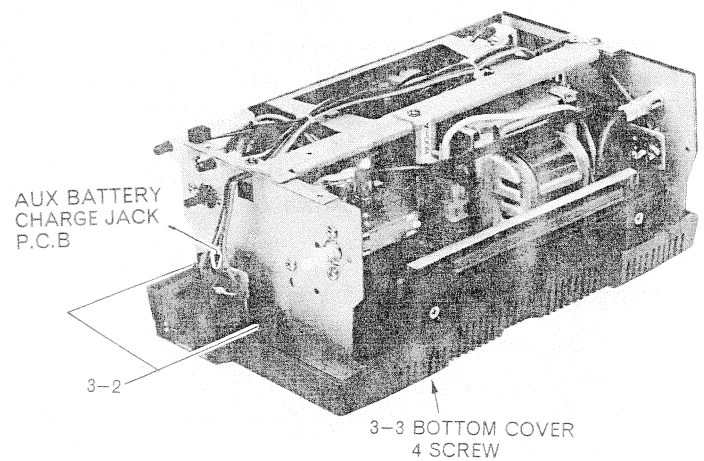
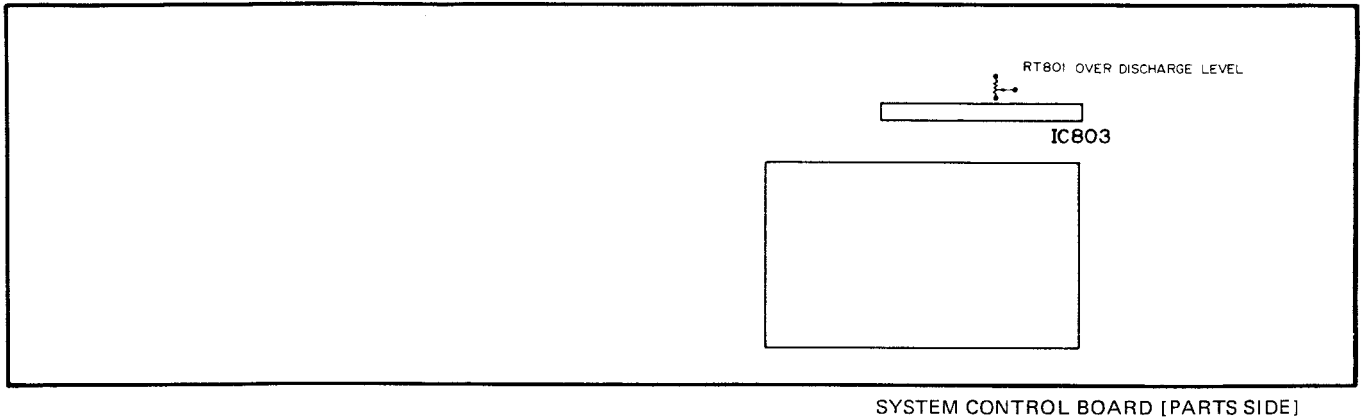


Fig. 34

ADJUSTMENT

VT-6500E

1. Electric circuit adjustment

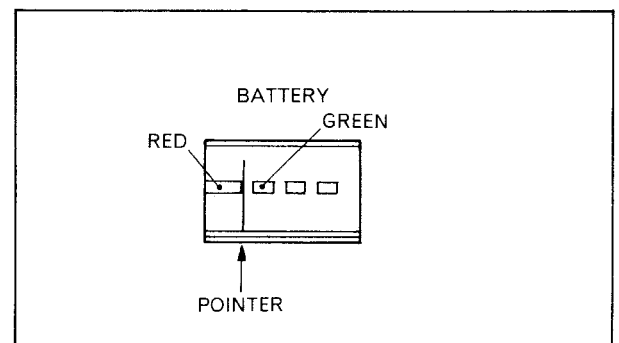


Over-discharge level adjustment

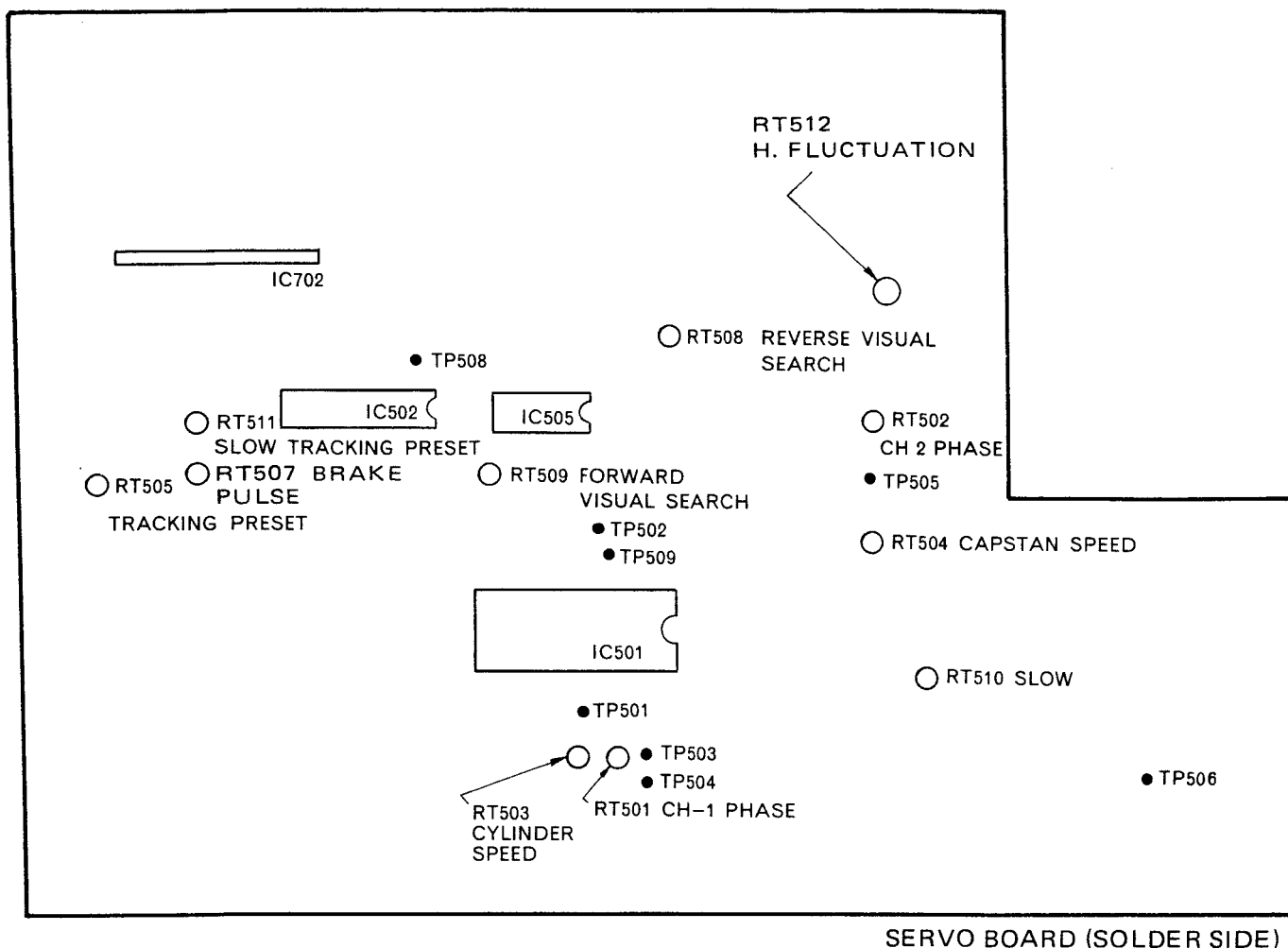
- 1) Turn RT801 (OVER-DISCHARGE LEVEL) fully clockwise.
- 2) Connect the DC power supply to the internal battery jack of the VTR.

Set the output voltage of the DC power supply to $11.2 \pm 0.05V$.

- 3) Turn the operate switch on.
- 4) Adjust RT801 (OVER-DISCHARGE LEVEL) so that the pointer of the battery meter is set to the center between the green and red marks.



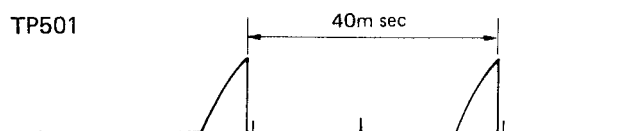
Servo circuit adjustment (Servo PC Board)



SERVO BOARD (SOLDER SIDE)

1. Cylinder speed adjustment

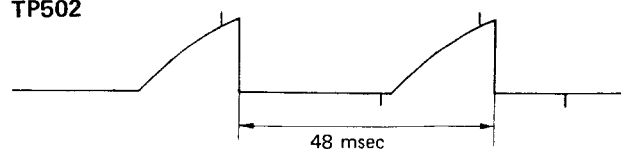
- 1) Record a TV broadcast.
- 2) Short-circuit between TP503 and TP504.
- 3) Connect the oscilloscope to TP501.
- 4) Adjust RT503 (CYLINDER SPEED) so that the pulse does not flow in the triangular wave.
- 5) Release short-circuit between TP503 and TP504.



2. Capstan speed adjustment

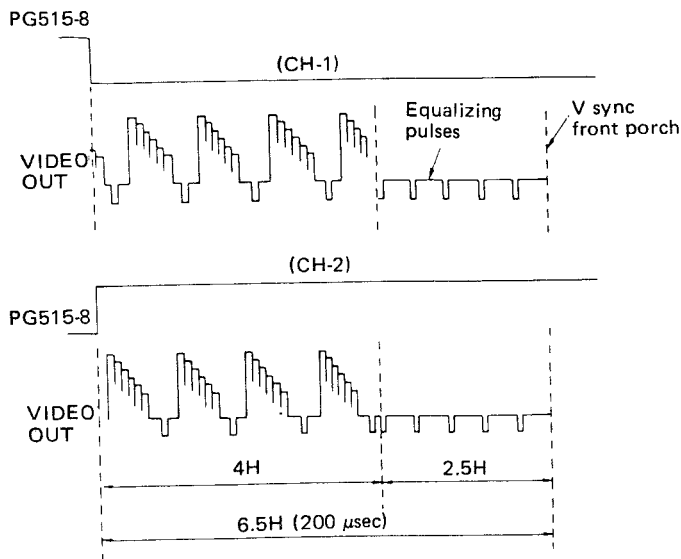
- 1) Record a TV broadcast.
- 2) Short-circuit between TP503 and TP504.
- 3) Connect the oscilloscope to TP502.
- 4) Adjust RT504 (CAPSTAN SPEED) so that the pulse does not flow in the triangular wave.
- 5) Release short-circuit between TP503 and TP504.

TP502



3. CH-1/CH-2 phase adjustment

- 1) Playback the alignment tape.
- 2) Connect CH-1 of the oscilloscope to the video output terminal and CH-2 to TP206 (SW25Hz) of the luminance/chroma Board.
- 3) Apply synchronization to CH-2 to set the synchronization slope to "-".
- 4) Adjust RT501 (CH-1 PHASE) so that the front porch of the vertical synchronization signal is 6.5H after the trailing edge of the CH-2 waveform.
- 5) Set the synchronization slope to "+".
- 6) Adjust RT502 (CH-2 PHASE) so that the front porch of the vertical synchronization signal is 6.5H after the leading edge of the CH-2 waveform.



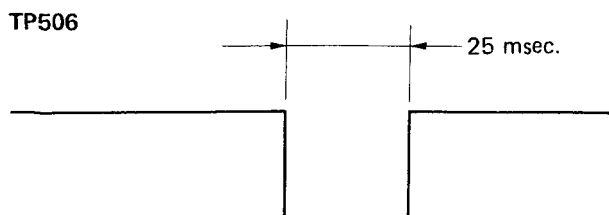
4. Tracking preset adjustment

- 1) Set the tracking knob to the click position.
- 2) Record a TV broadcast.
- 3) Connect the oscilloscope to TP203 on the luminance/chroma Board.
- 4) Playback the recorded section.
Adjust RT505 (TRACKING PRESET) so that the points where the amplitudes of CH1 and CH2 FM envelopes begin to drop are in phase.

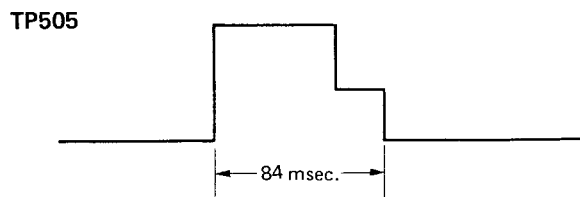


5. Brake pulse, slow, slow tracking preset adjustment

- 1) Record a TV broadcast
- 2) Connect the remote control and slow-playback the recorded section.
Set the slow rate higher (approx. 1/5), and turn the slow tracking knob to the 12 o'clock position.
- 3) Connect the oscilloscope to TP506.
- 4) Adjust RT507 (BRAKE PULSE) to set the pulse width to 25 msec.



- 5) Connect the oscilloscope to TP505.
- 6) Adjust RT510 (SLOW) to set the center of variation of the pulse width to 84 msec.



- 7) Adjust RT511 (SLOW TRACKING PRESET) to set so that no noise appears in the played back picture.
When noise does appear, adjust so that it is even on the screen.

6. Visual search adjustment

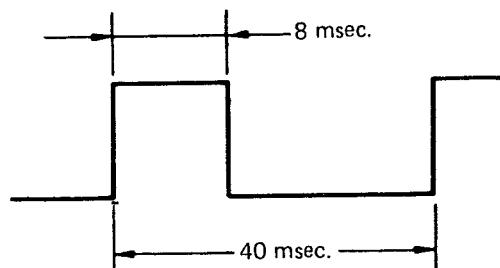
Forward Visual Search

- 1) Connect a oscilloscope to TP508.
- 2) Play back a tape recorded with the colour bar Signal or the TV signal in the forward visual search mode.
- 3) Adjust RT509 (FORWARD VISUAL SEARCH) to obtain the 8 ms pulse period.
- 4) Adjust RT509 to stop the two noise bands on the TV screen.

Reverse Visual Search

- 1) Connect a oscilloscope to TP508.
- 2) Play back a tape recorded with the colour bar Signal or the TV signal in the reverse visual search mode.
- 3) Adjust RT508 (REVERSE VISUAL SEARCH) to obtain the 8 msec pulse period.
- 4) Adjust RT508 to Stop the three noise band on the TV screen.

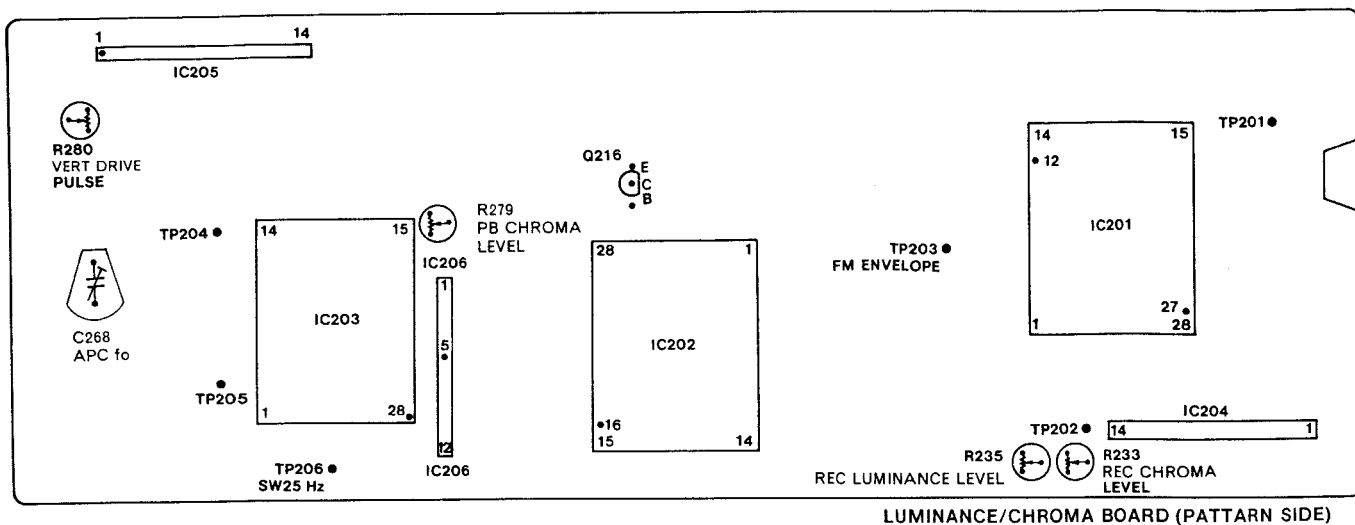
Note: Reverse Visual Search Adjustment shall be performed after Forward Visual Search Adjustment.



7. Horizontal Fluctuation Adjustment

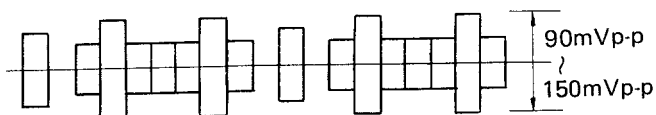
- 1) Connect the VTR to a TV set.
- 2) Load a recorded tape and place the instrument in the slow mode.
- 3) Set the slow speed control knob to 1/5 speed.
- 4) Adjust RT512 (H. FLUCTUATION) so that the horizontal fluctuation is minimum on the monitor screen.

Luminance/chroma circuit adjustment



1. Record luminance level/record chroma level adjustment

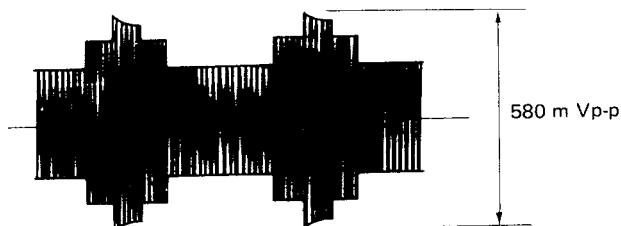
- 1) Connect the color bar generator to the video input terminal.
- 2) Record the color bar.
- 3) Connect the oscilloscope to TP201.
- 4) Turn R235 (REC LUMINANCE LEVEL) to minimize the waveform.
- 5) Adjust R233 (REC CHROMA LEVEL) to set the color level to the value shown in the table while matching to the cylinder mark.



- 6) Adjust R235 (REC LUMINANCE LEVEL) to set the LUMINANCE level to 580 mVp-p.

REC Chroma level

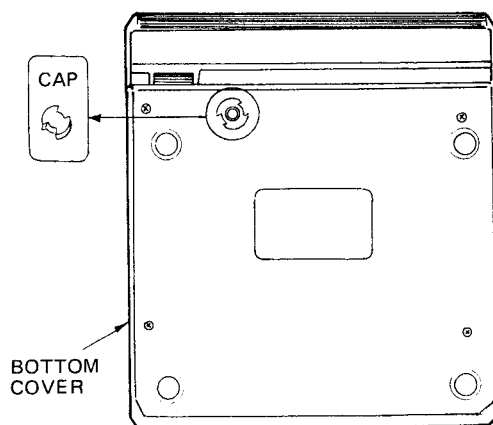
Cylinder mark	Level
Without marks	90 mVp-p
1	100 mVp-p
2	120 mVp-p
3	140 mVp-p
4	150 mVp-p



2. Vertical drive pulse adjustment

- 1) Record a TV broadcast.
- 2) Still-playback the recorded section.
- 3) Adjust R280 (VERT DRIVE PULSE) so that the picture does not fluctuate.
- 4) Set to the SLOW mode and check that the picture does not fluctuate.
- 5) Re-adjust it when any fluctuation occurs.

Note: This adjustment can be performed by removing the Cap on the bottom cover, shown in the next figure, without removing the top cover and bottom cover.

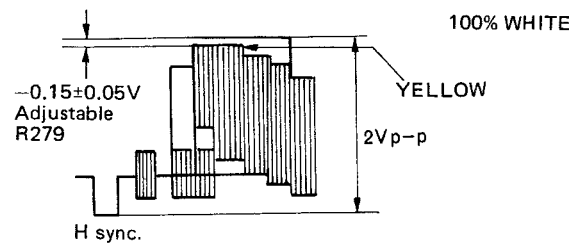


3. APC fo adjustment

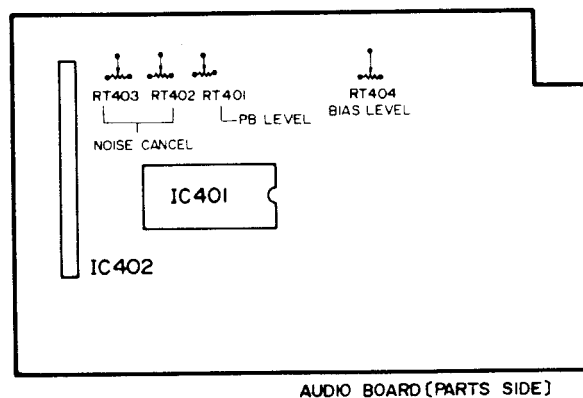
- 1) Set the VTR stop mode
- 2) Connect the counter to TP204.
- 3) Adjust C268 so that the frequency measured by the counter is $4.435572 \text{ MHz} \pm 50 \text{ Hz}$.

4. Play back chroma level adjustment

- 1) Play back the colour bar signal of the alignment tape.
- 2) Connect the oscilloscope to the video output.
- 3) Adjust R279 (PB CHROMA LEVEL) so that the wave from is as shown in the figure.



Audio circuit adjustment (Audio PC Board)



1. Play back level adjustment

- 1) Play back the 1kHz signal of the alignment tape.
- 2) Connect the VTVM to the audio output terminal.
- 3) Adjust RT401 (PB LEVEL) to set the level to $-6\text{dB} \pm 1\text{dB}$.

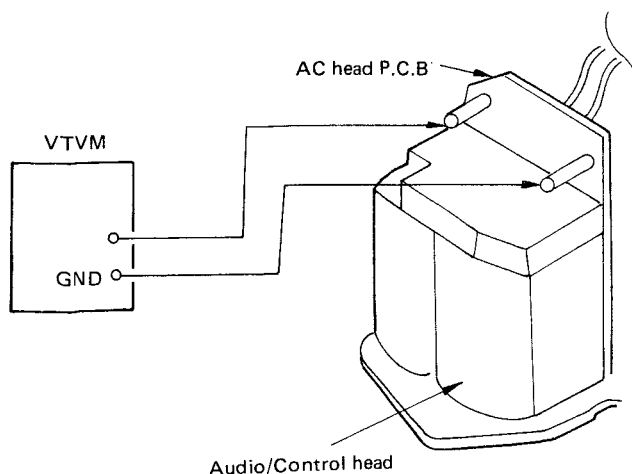
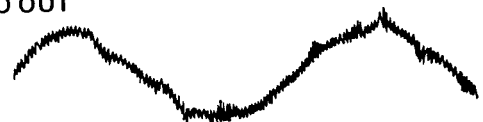
2. Bias level adjustment

- 1) Load a blank tape and set the VTR to the record mode.
- 2) Connect the VTVM to 2 pins of the AC head PC Board.
- 3) Adjust RT404 (BIAS LEVEL) to set the level to $1.1 \pm 0.05\text{ mVrms}$.

3. Noise cancel adjustment

- 1) Load a blank tape and set the VTR to the PLAY mode.
- 2) Connect the CH-1 probe of the oscilloscope to the audio output terminal.
- 3) Adjust RT402, RT403 (NOISE CANCEL) alternately to minimize noise in the CH-1 waveform.

AUDIO OUT



2. MECHANICAL ADJUSTMENT

Adjusting all parts

Cylinder tach head adjustment

1) (Rough adjustment)

Loosen the tach head bracket fixing screw and move the bracket to set the interval between the head and magnet to 0.5 ± 0.1 mm.

(Fine adjustment)

Observing the wave form of IC501 (HA-11727) 2 pin, perform the Gap adjustment to meet the number of waves to the specified number.



By observing the above positive polarity pulse, adjust to satisfy the following relation; $V_A > 0.75V_p$, $V_B < 0.39V_p$

- Adjust the other magnet in the same way, and tighten screws after both magnets satisfy the values given above.

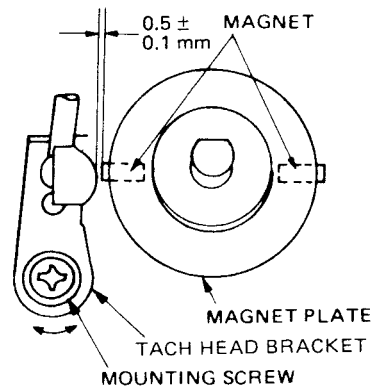


Fig. 45

Reel sensor adjustment

- Loosen the reel sensor PC Board fixing screws.
- Tighten screws after setting the interval between the sensor and magnet to less than 1.5 mm.

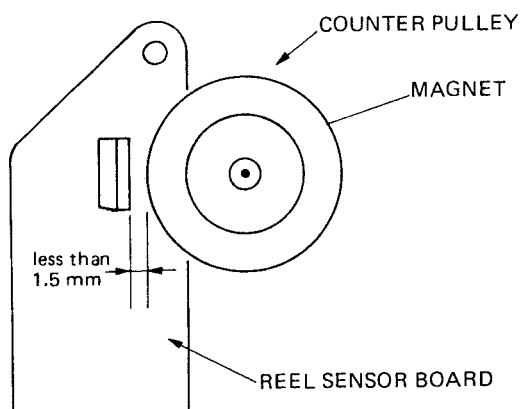


Fig. 46

Mechanical state sensor switch adjustment

- Turn the pulley in the unloading direction until it stops.
- Loosen the fixing screw and move the switch so that the V-shaped groove of the switch and the triangular hole match when viewed from the top.
- Tighten the fixing screw.

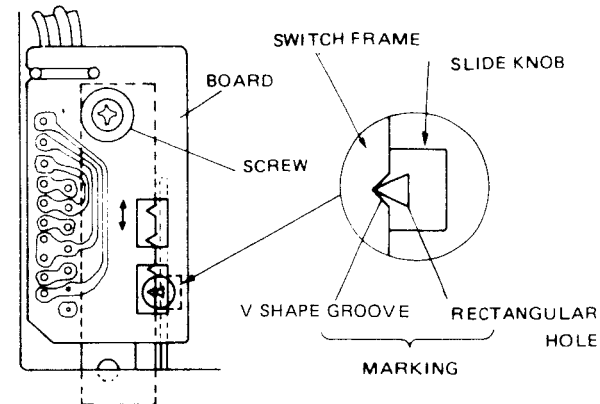


Fig. 47

Reel disk height adjustment

- Mount the master plane to the cassette holder and hang the cassette holder.
- Place the Reel disk height jig on the master plane and apply it to the reel disk.
- Adjust the number of spacers (2 types; 0.25 mm thick, 0.5 mm thick) at the bottom of the reel disk to adjust the height of the reel disk so that it can enter between jigs A and B.
(Insert the spacer between the reel disk and the metal washer)

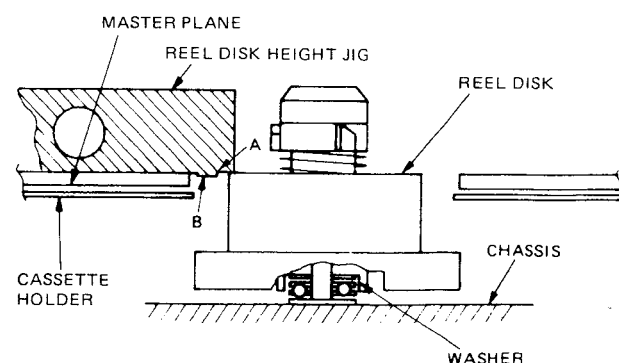


Fig. 48

Guide pole adjustment

- Mount the master plane to the cassette holder.
- Place the reel disk height jig on the master plane and lightly press it against the guide pole.
- Turn the nut at the top of the guide pole and set the interval between the top of the square gauge and the top flange to 0.1 ± 0.1 mm.
- Remove the jig.
- Perform "Running adjustment".

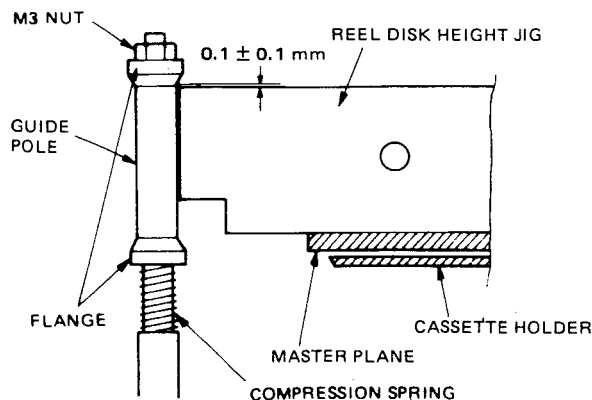


Fig. 49

AC Head adjustment

(Rough adjustment)

Tilt adjustment

- 1) Mount the master plane to the cassette holder and bring the reel disk height jig nearer to the AC head.
- 2) Turn the tilt adjustment screw so that the AC head surface and the reel disk height jig surface are parallel.

Azimuth adjustment

- 1) Turn the azimuth adjustment screw so that the side of the AC head and the side of the reel disk height jig are parallel.
- 2) Remove the jig.

Height adjustment

- 1) Load a tape, and stop in the loaded condition.
- 2) Turn the height adjustment screw so that the core top of the audio erase head is a little above the tape (0.2 mm or less). The core bottom of the CONTROL head should slightly extrude from the tape at this time.

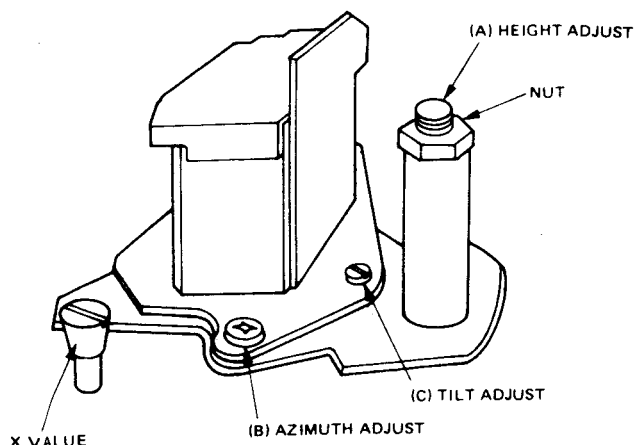


Fig. 50

(Fine adjustment)

Tilt adjustment

- 1) Play back the 6 kHz audio signal of the alignment tape.
- 2) Connect the oscilloscope to the audio output terminal.
- 3) Adjust the tilt adjustment screw to minimize fluctuation of audio level in the audio output.

Azimuth adjustment

- 1) Adjust the azimuth adjustment screw to maximize the audio output of 6 kHz signal.

Height adjustment

- 1) Adjust the height adjustment screw to maximize the audio output.

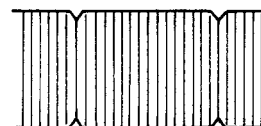
X value adjustment

- 1) Adjust the right/left motion of the A/C head base plate using the X screw so that the output of the FM envelope waveform is a maximum, with the tracking volume control set at the click position.

Alignment cassette

Oscilloscope

Envelope waveform (TP203/TP206 [Trigger] on the Luminance/Chroma board)



Tension pole position and tension adjustment

Position adjustment

- 1) Cover the light-receiving port of the supply end sensor using paper, etc.
- 2) Set the VTR to the PLAY mode without loading the tape.
- 3) Loosen the tension band fixing screw and put a screwdriver between the band holder and the groove in the chassis.
- 4) Move the band holder using the screwdriver, and set the gap between the tension arm and the fixed guide to 1.0 ± 0.5 mm.
- 5) Set the VTR to the STOP mode and tighten the screw.

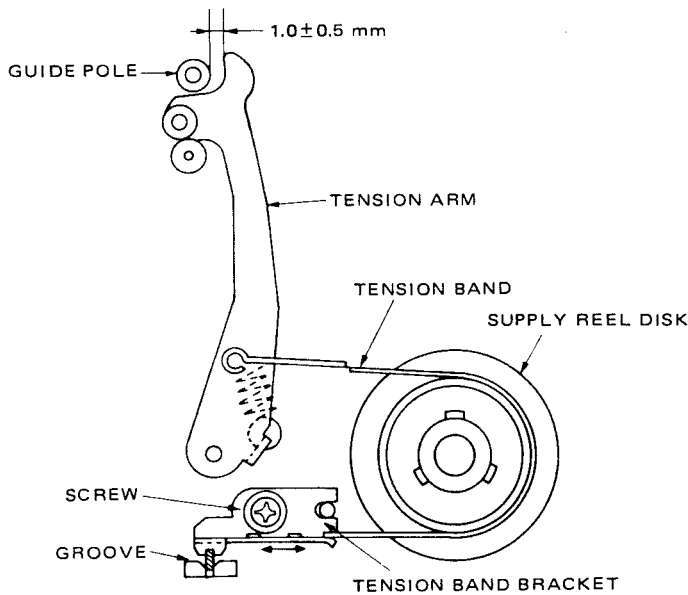


Fig. 51

Tension adjustment

- 1) Loosen the spring holder fixing screw.
- 2) Mount the back-tension meter and set the VTR to the PLAY mode.
- 3) Put a screwdriver in the tension adjustment groove on the left side of the set.
- 4) Move the spring holder and set tension to 30 ~ 45g cm.

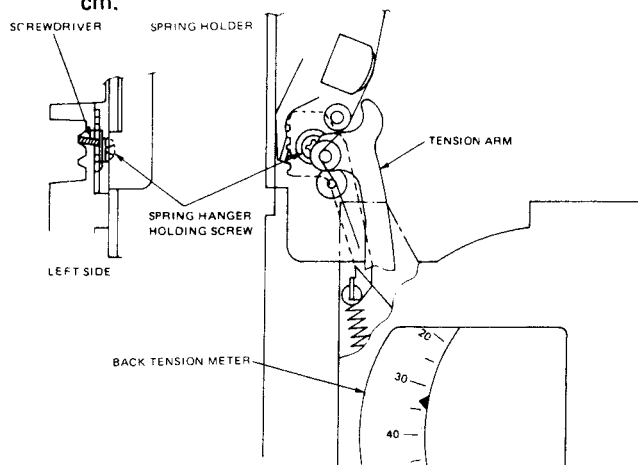


Fig. 52

- 5) Set the VTR to the STOP mode and tighten the screw.
- Check the pole position after adjusting tension.
- When both values are not satisfied, repeat adjustment.
- 6) Remove the paper used for covering the sensor after adjustment is completed.

Inclined guide adjustment

- 1) Run a blank tape.
- 2) Loosen the inclined guide fixing screw.
- 3) Move the guide to set so that no crease or curl occurs and then lock the fixing screw.
- Be sure not to turn the guide roller fixing screw at this time.
- 4) Perform "Running adjustment".

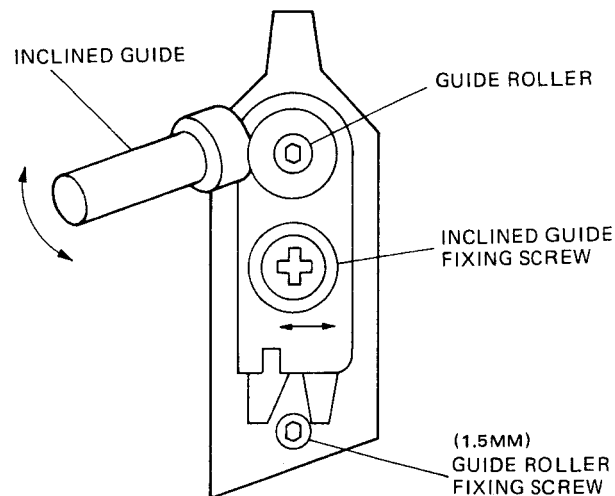


Fig. 53

Checking torques of all parts

The measured values listed below are reference.

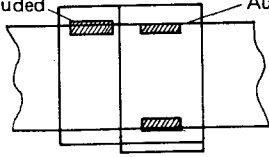
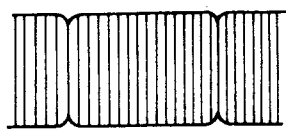
	Item	Mode	Measured reel	Measured value
1	Main brake torque	STOP	Both reels	200 gcm or more
2	Slack removal torque	Unloading	Supply reel	100 ~ 200 gcm
3	Rewind	REW	Supply reel	400 gcm or more
4	Take-up	PLAY	Take-up reel	70 ~ 120 gcm
5	FF	F. FWD	Take-up reel	400 gcm or more
6	Supply back-tension	F. FWD	Supply reel	4 ~ 15 gcm
7	Take-up back-tension	REW	Take-up reel	4 ~ 15 gcm
8	Take-up brake torque	(1) ◀◀ Visual search (2) Loading (3) Unloading (4) REC Pause	Take-up reel	80 ~ 140 gcm
9	Search torque	◀◀ Visual search	Supply reel	230 ~ 300 gcm

Tape transport adjustment

It is required to perform the running check adjustment shown below when the upper cylinder or AC head is replaced or removed and refitted or when the tape guide pieces (fixed guide post, impedance roller, guide roller, etc.) are replaced. Do not detach or adjust the parts shown

below. They are adjusted and fixed in the factory using fine jigs, so when they are detached and adjusted, overall running adjustment becomes impossible.

1. Left/right catcher installation screws.

Check item	Judgement	Tool/measuring instrument
Back-tension	30 ~ 45 gr/cm (VTR in horizontal)	Back-tension meter
Guide pole	Tape should slide along the lower flange and not crease or curl.	By eye
Inclined guide and guide roller	Conspicuous creases or curls not present in tape. No adherence of dust.	By eye
Tape	Conspicuous distortion of the tape or change should not be present.	By eye
Impedance roller	Roller should rotate smoothly	By eye
AC head	Tape should keep contact fully with the control head core and audio head core. Approx. 0.2 mm protruded. 	By eye Diagram on the left shows reference values.
Envelope	Conspicuous fluctuation should not be present The ratio of the max. section and minimum section of the envelope should be 60% or more (at the worst tracking adjustment) The fluctuation in width of the envelope should be 20% or less. Envelope should be within 80% or more of max. with the tracking knob set to the click position.	Alignment Oscilloscope (TP203, TP206-Trigger)  Envelope wave

Adjust the positions shown below depending on the parts replaced when parts are refitted or replaced.

1. When the upper cylinder is replaced.

	Judgement
Guide roller height	Creases and curls should not occur in the tape
Inclined guide angle	Check fluctuation and flatness of the envelope
Video Head Change	Check, X value, AC head position, switching point, REC LUMINANCE CHROMA level Check following adjustments Page. 18 Section 3 CH1/CH2 phase adjustment (switching point). Page. 19 Section 4 Tracking adjustment. Page. 20 Section 1 Record luminance level/Record chrom level adjustment and playback chroma level adjustment.

2. When the AC head is replaced

	Judgement
AC head height	Check the audio or control track width
AC head azimuth	Maximize audio playback level
AC head tilt	No slack at the top and bottom of the tape
X value position	Conspicuous audio level fluctuation should not be present

3. When the guide roller and inclined guide are replaced.

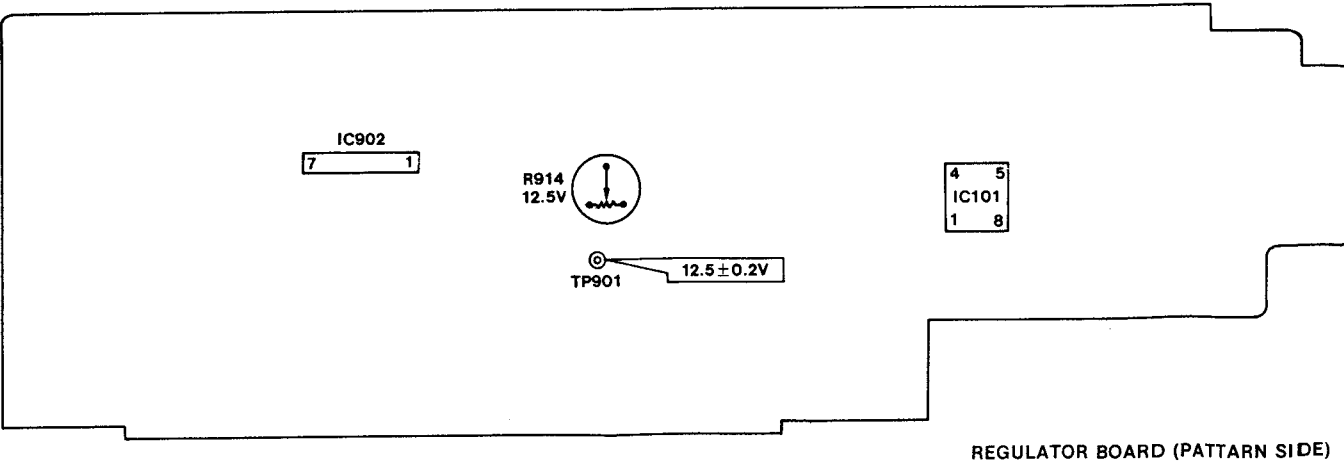
Same as in item 1.

4. When the guide pole is replaced.

	Judgement	Tool
Guide pole height	No creases or curls should be present. Envelope should not fluctuate	Nutdriver Oscilloscope

VT-TU65E

Electric circuit adjustment (Regulator Board)



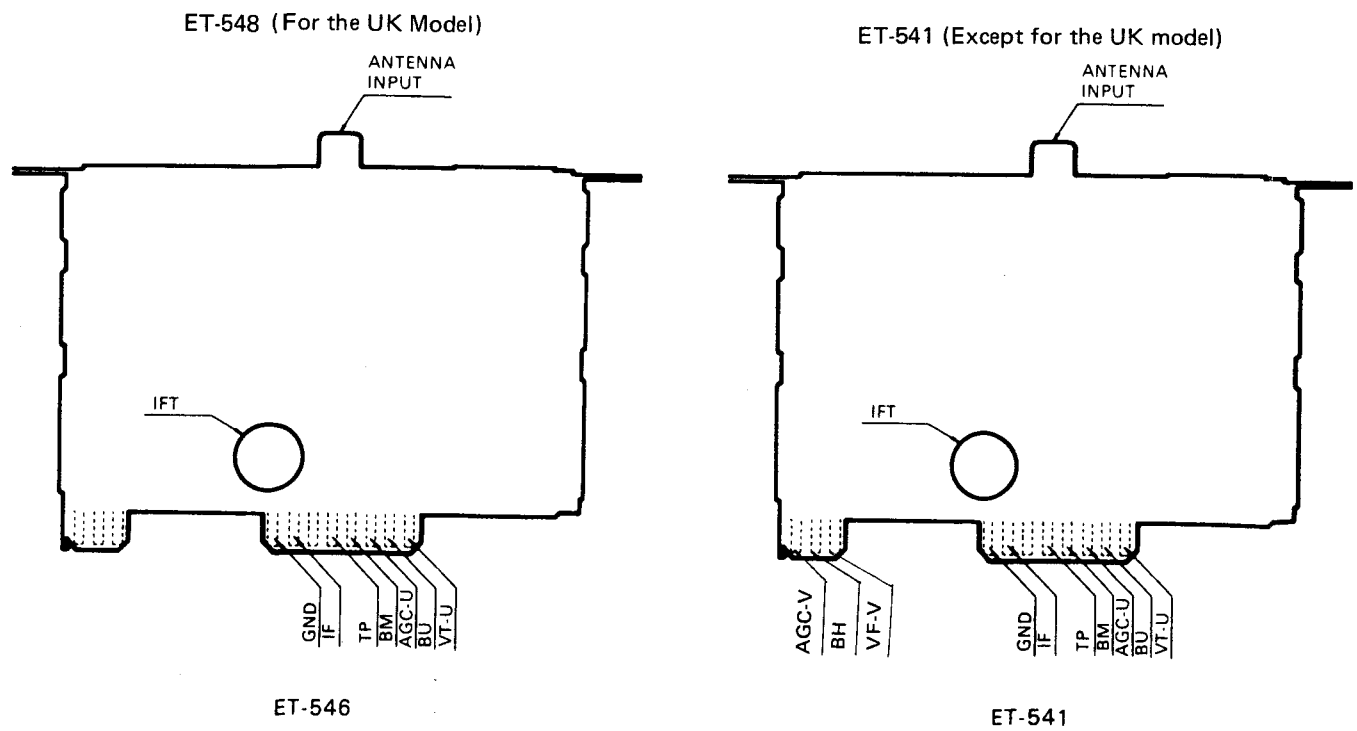
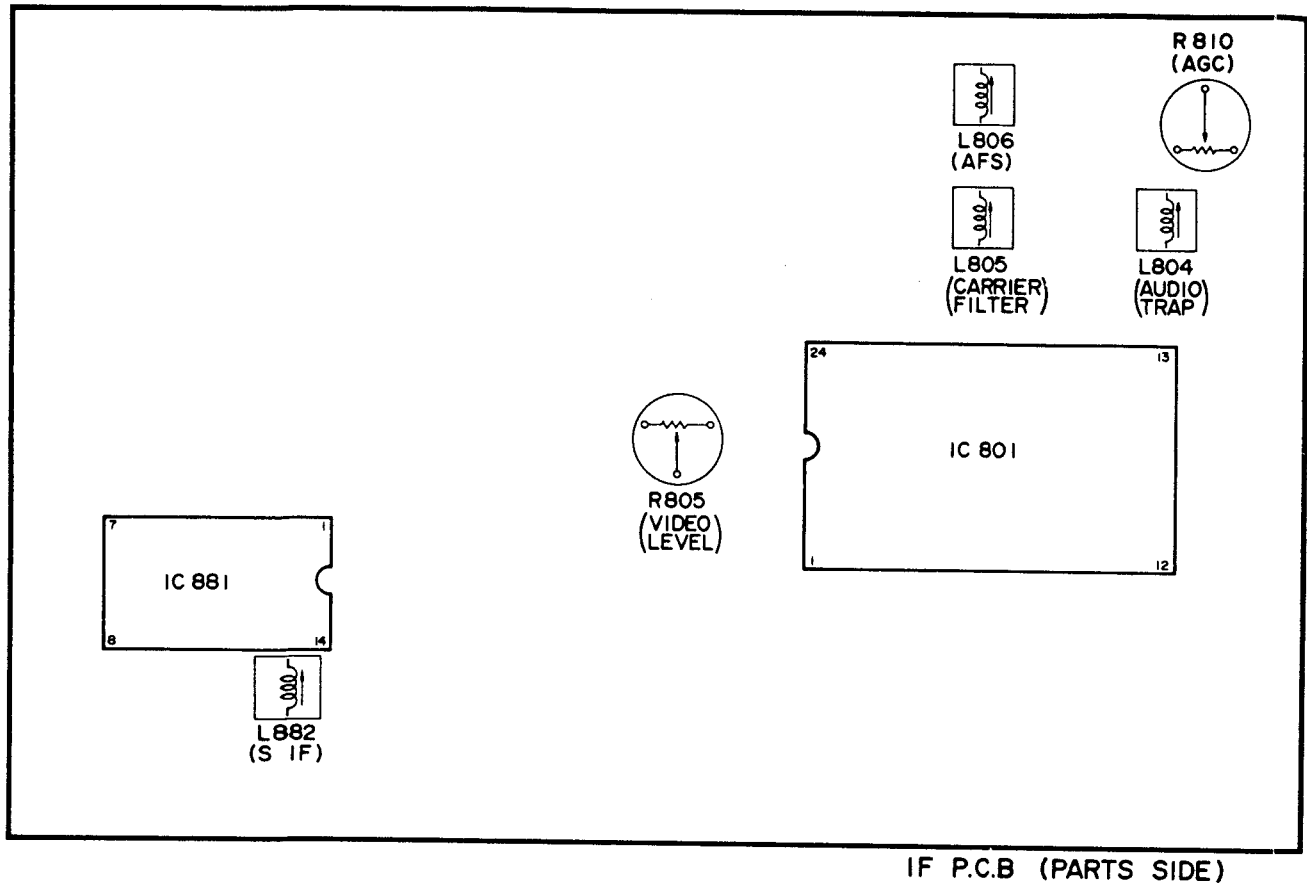
12.5V adjustment

1. Connect a VIDEO TUNER (VT-TU65E) to the VTR.
2. Turn the VTR operate switch on.

3. Connect a DC voltmeter to TP901.
4. Adjust R914 (12.5V) so that the reading of the voltmeter is $12.5V \pm 0.2V$.

Tuner/IF circuit adjustment

PARTS LOCATIONS OF CONTROLS AND TEST POINTS

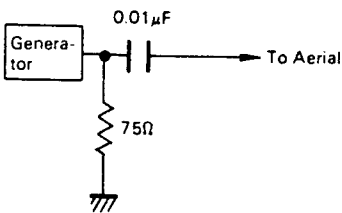


1. CARRIER FILTER AND VIDEO AMPLITUDE ADJUSTMENT

Positions to be adjusted: L805, R805

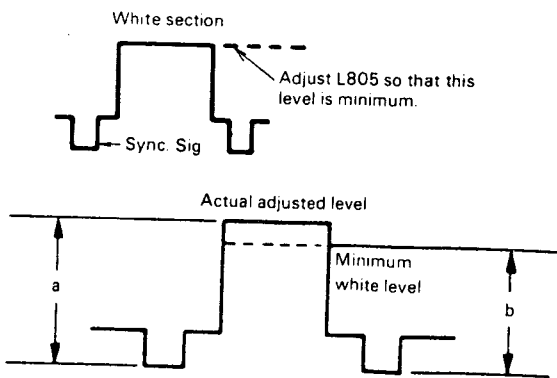
Preparation

- 1) Input signal:
Apply the following signal to the aerial input.
a. White test pattern generator with RF output.
- 2) Connect the oscilloscope to IC801-24 (set to DC range).
- 3) Turn the operate switch on.
- 4) Signal level:
-41 dBm \pm 10 dBm (converted to antenna input)
0 dBm = 1 mW



Adjustment procedure

- 1) Turn the core of L805 clockwise so that it touches the P.C. Board surface.
- 2) Next, turn the core gradually counterclockwise to check that the normal detection waveform appears and the white section shown in Fig. 17 is larger than a minimum. Turn the core clockwise from this position and stop just before the white section begins to increase. Adjustment precision: b/a (shown in Figure should be 0/ +0.5, -0 dB.)
- 3) Adjust R805 so that the value of the video signal is 1.25 \pm 0.05 Vp-p.

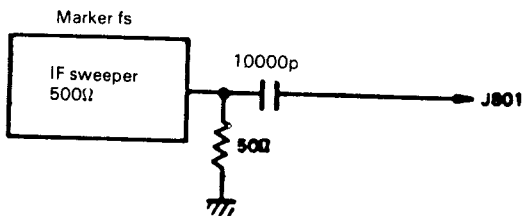


2. AUDIO TRAP ADJUSTMENT

Position to be adjusted: L804

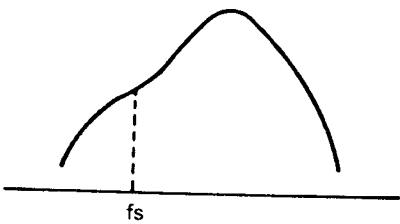
Preparation

- 1) Input signal
Apply the following signal to TP of the ET-548 [ET541] IF sweeper.
- 2) Connect the oscilloscope to IC801-24.
- 3) AGC voltage.
Connect pin 22 of IC801 to ground and apply 8.6/ +1 -0V. to pin 12 of IC801.
- 4) Connect a 50Ω resistor in parallel with L805 (between pins 18 and 19 of IC801).



Adjustment procedure

Adjust L804 so that point of the waveform at IC801-24 is a minimum.

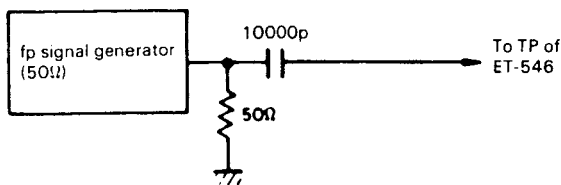


3. AFS ADJUSTMENT (AUTOMATIC FINE SETTING)

Position to be adjusted: L806

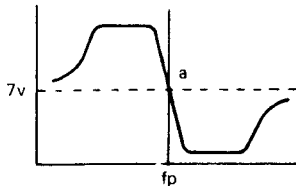
Preparation

- 1) Input signal
Apply the following signal to TP of ET-548. [ET-541]
- 2) Connect the voltmeter to terminal 16 of IC801.
- 3) AGC voltage
Connect pin 22 of IC801 to ground and apply 8.6V to pin 12.
- 4) Turn the operate switch on.
- 5) Adjust the output level of the signal generator so that the waveform at IC801-24 is 0.7 Vp-p at AM 40% modulation.



Adjustment procedure

Adjust L806 so that the voltmeter shows $7.0 \pm 1.0V$ with the fp signal.

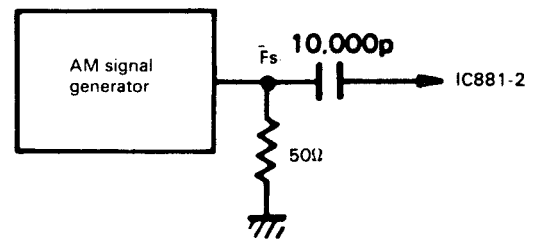


4. S IF (SOUND IF) ADJUSTMENT

Position to be adjusted: L882

Preparation

- 1) Apply an AM reference signal to IC881-2.
Setting the output of the AM standard signal generator.
 - a. Carrier wave frequency:
 - 6.0 MHz ± 5 kHz (For the UK)
 - 5.5 ± 5 kHz (Except for the UK)
 - b. Modulation frequency: 400 Hz
 - c. Modulation: AM 30%
 - d. Output level: -75 dBm ~ -55 dBm
- 2) Connect pin 6 of IC881 to ground (It is not necessary to do this when pin 6 is grounded).
- 3) Connect the oscilloscope to terminal 4 of CN801.
- 4) Turn the operate switch on.



Adjustment procedure

Adjust L882 so that the signal amplitude is a minimum.

5. P IF (PICTURE IF) ADJUSTMENT

Position to be adjusted: IFT of ET-548 [ET-541]

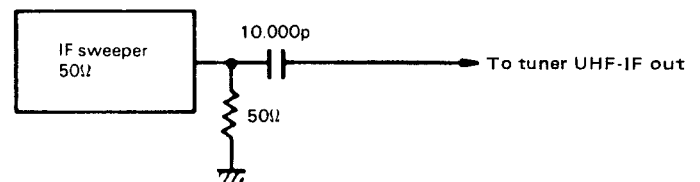
Preparation

Sweeper method (Simple method):

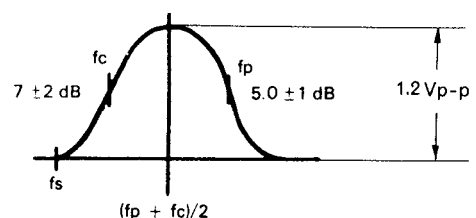
- 1) The following voltage is applied to the tuner.
- 2) Voltage applied to the P.C. Board.
- 3) Connect a 50Ω resistor in parallel with L804 (between pin 18 and 19 of IC801).
- 4) Connect the oscilloscope to TP801.

Adjustment procedure

Adjust the coil IFT so that the peak of the waveform is around the band's center and the marker level is within the following values.

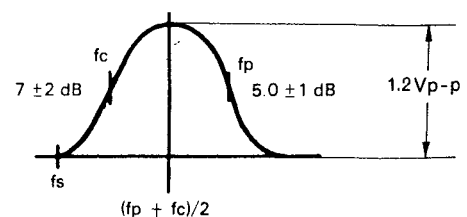


[For ET-548]



$$\begin{aligned} f_p &= 39.5 \text{ MHz} \\ f_c' &= 35.07 \text{ MHz} \\ f_s &= 33.5 \text{ MHz} \end{aligned}$$

[For ET-541]



$$\begin{aligned} f_p &= 38.9 \text{ MHz} \\ f_c' &= 34.47 \text{ MHz} \\ f_s &= 33.4 \text{ MHz} \end{aligned}$$

6. AGC (AUTOMATIC GAIN CONTROL) ADJUSTMENT

Position to be adjusted: R810

Preparation

- 1) Apply the RF signal to the aerial terminal
Signal level: -47 dBm. (aerial input)
- 2) Connect the voltmeter to the AGC terminal of the tuner.
Use a voltmeter with an internal impedance of more than $100\text{ k}\Omega$.

Adjustment procedure

Measure the voltage at the beginning when there is no signal. (Assume this voltage to be V_1).

Next, input the signal and adjust R810 to obtain $V_1 + 0.1/+0.1, -0.05\text{V}$ (with AFS ON).



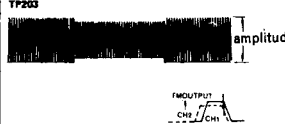
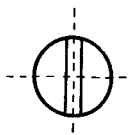
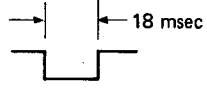
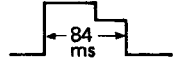
Since this adjustment is affected by the circuit's temperature drift perform a heat-run for more than 2 minutes in the signal reception mode.

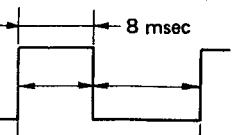
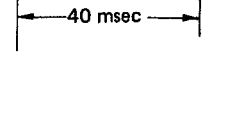
VT-6500E

(System control Board)


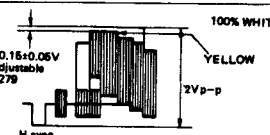
Adjustment item	Test point	Measuring instrument and operation	Adjusted position	Measured value
Overdischarge level	battery meter	Connect DC power supply to internal Battery jack, and set to DC11.2V	RT801	Set the pointer to the center between green and red marks.

(Servo Board)

Cylinder (disk) speed	TP501	<ul style="list-style-type: none"> ● Oscilloscope ● TP504, TP503 Short-circuit ↓ Open 	RT503	Pulse approximately stops at triangular wave ↓ Waveform locked
Capstan speed	TP502	<ul style="list-style-type: none"> ● Oscilloscope ● REC mode ● TP504, TP503 Short-circuit ↓ Open 	RT504	Pulse approximately stops at triangular wave ↓ Waveform locked
CH-1, CH-2 phase	CH1 Video output terminal CH2 TP206 (SW25Hz)	<ul style="list-style-type: none"> ● Oscilloscope: synchronized by TP206		Front porch 6.5H after the edge of sync waveform (SW25)
		<ul style="list-style-type: none"> ● Alignment tape: standard playback Synchronization (—) Synchronization (+)	RT501 RT502	
Tracking preset	TP203	<ul style="list-style-type: none"> ● Oscilloscope ● Tracking knob: Center click position ● Recording: Color bar (TV signal) ↓ Playback 	RT505	Envelope
Horizontal Fluctuation	TV	<ul style="list-style-type: none"> ● Playback a tape recorded Slow rate higher (approx. 1/5) ↓ Monitor screen	RT512	Horizontal fluctuation
Brake pulse	TP506	<ul style="list-style-type: none"> ● Oscilloscope ● Recording: Color bar (TV signal) ↓ 1/5 Slow <ul style="list-style-type: none"> ● Slow tracking knob: Direction: 12 o'clock 	RT507	
Slow	TP505		RT510	
Slow tracking preset	TV	<ul style="list-style-type: none"> ● Connect to TV 	RT511	Drive-out noise or distribute evenly on the top/ bottom.

Adjustment item	Test point	Measuring instrument and operation	Adjusted position	Measured value
Visual Search Foward Visual Search	TP508	● Oscilloscope ● Playback a tape recorded: ↓ Colour bar (TV signal) ↓ Forward Visual Search mode	RT509	
Reverse Visual Search	TP507	● Oscilloscope ● Playback a tape recorded: ↓ Colour bar (TV signal) ↓ Reverse Visual Search	RT508	

(Luminance/chroma Board)

REC Chroma level	TP201	● Video input terminal: Color bar ● Oscilloscope	R233	Cylinder mark None, (1)–(3): 90 mVp-p (4),(5): 150 mVp-p
REC luminance level	TP201		R235	
Vert. drive pulse	TV	● TV ● Recording ↓ Still	R280	Adjust so that picture does not fluctuate
APC fo	TP204	● VTR Stop mode ● Counter	C268	4.435572 MHz ± 50 Hz
PB chroma level	Video output	● Alignment tape ● Colour bar signal	R279	

(Audio Board)

Play level	Audio output terminal	● VTVM ● Alignment tape: 1 kHz PLAYBACK	RT401	− 6 dB ± 1 dB
Bias	AC head test pin	● VTVM ● Record mode	RT404	1.5 ± 0.05 mVrms
Noise cancel	Audio output terminal	● Blank tape: PLAY mode ● Oscilloscope CH-1: Audio output terminal	alternately RT402 RT403	Minimum noise

VT-TU65A

(Regulator Board)

12.5 V	TP901	● Voltmeter ● VIDEO TUNER(VT-TU65E) ↔ VTR(VT-6500E)	R914	12.5 V ± 0.2V
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Note

1. Voltage measured at base of chassis with minimum volume control and no signal.
() are shown in recording condition.
2. Nomenclature of Resistors and Capacitors.

Circuit No.	
Value	No indicated Ω(Ohm) M: 1000kΩ
Tolerance	No indicated ±5% K: ±10% M: ±20%
Wattage	No indicated ¼W
Sort	No indicated Carbon film RC: Composition RW: Wire wound RS: Oxide metal film RN: Fixed metal film

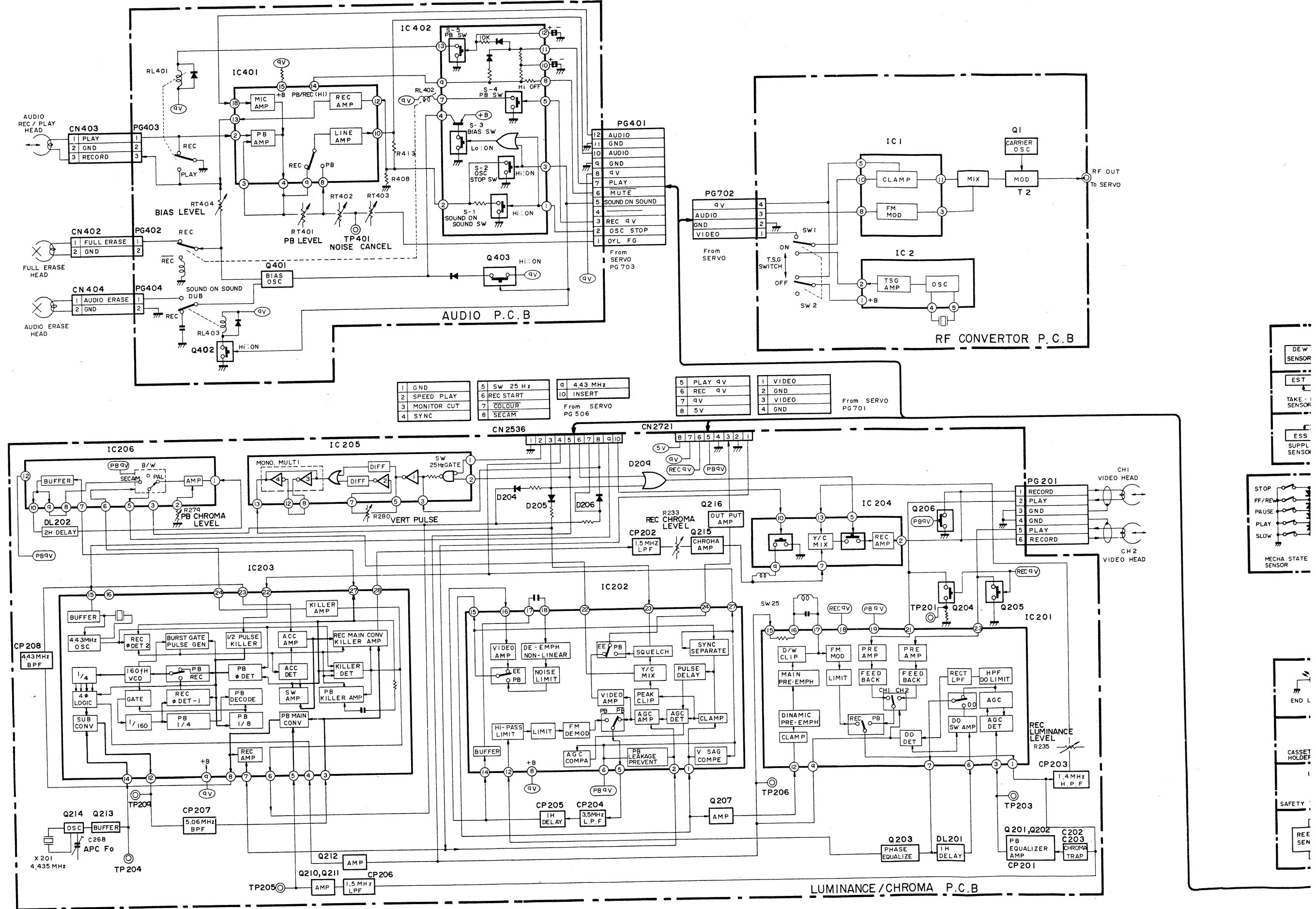
Circuit No.	
Value	No indicated μF P: PF
Tolerance	No indicated ±10% J: ±5% M: ±20% Z: ±80% −20% D: ±0.5pF C: ±0.25pF
Sort	Ceramic Electrolytic Mylar Polyester Styrol
Voltage	No indicated 50WV

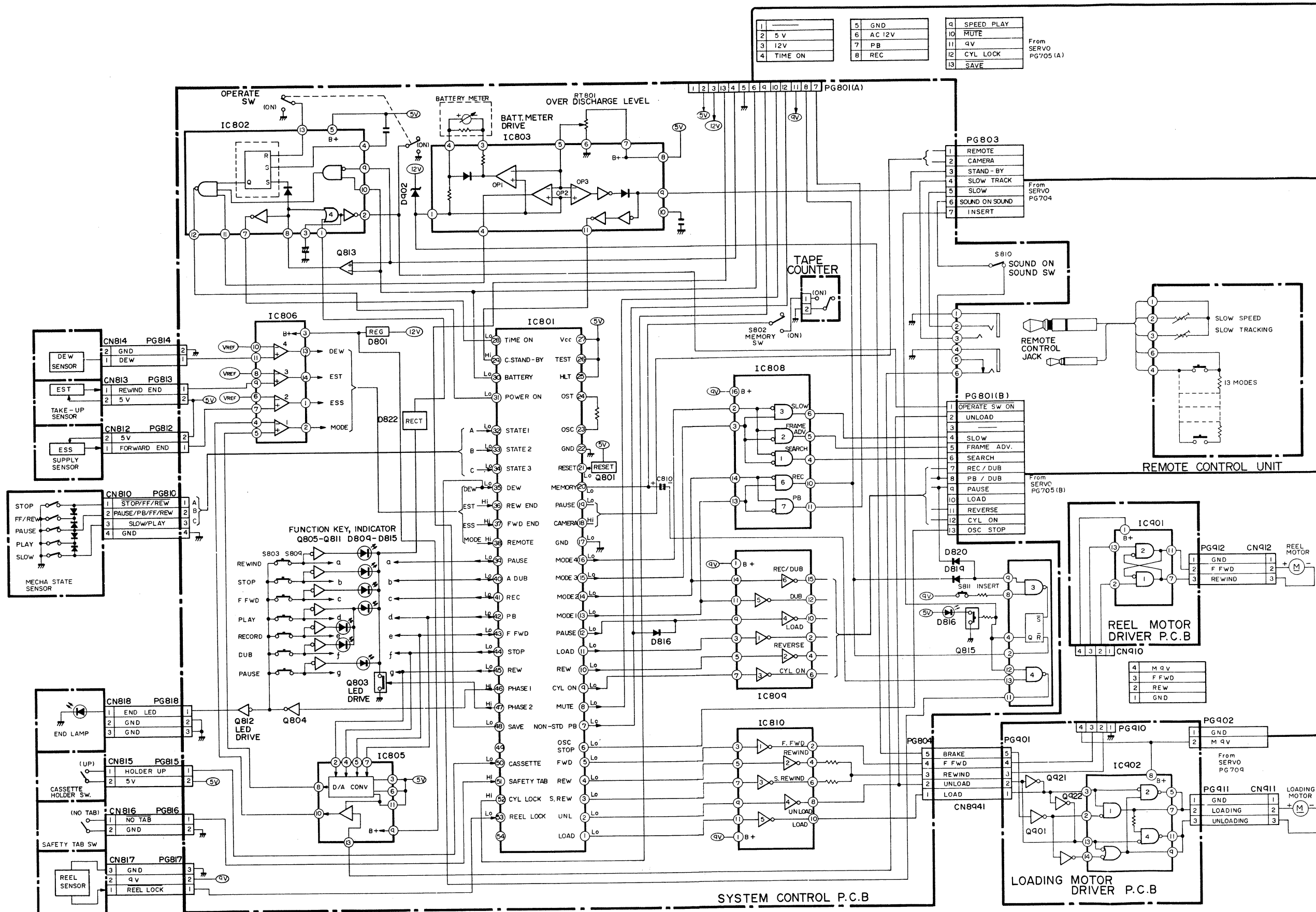
3. Be sure to make your orders of resistors and capacitors with value, voltage, tolerance and sort.
4. When replacing capacitors marked with * use specified ones stated on parts list since required temperature characteristics.

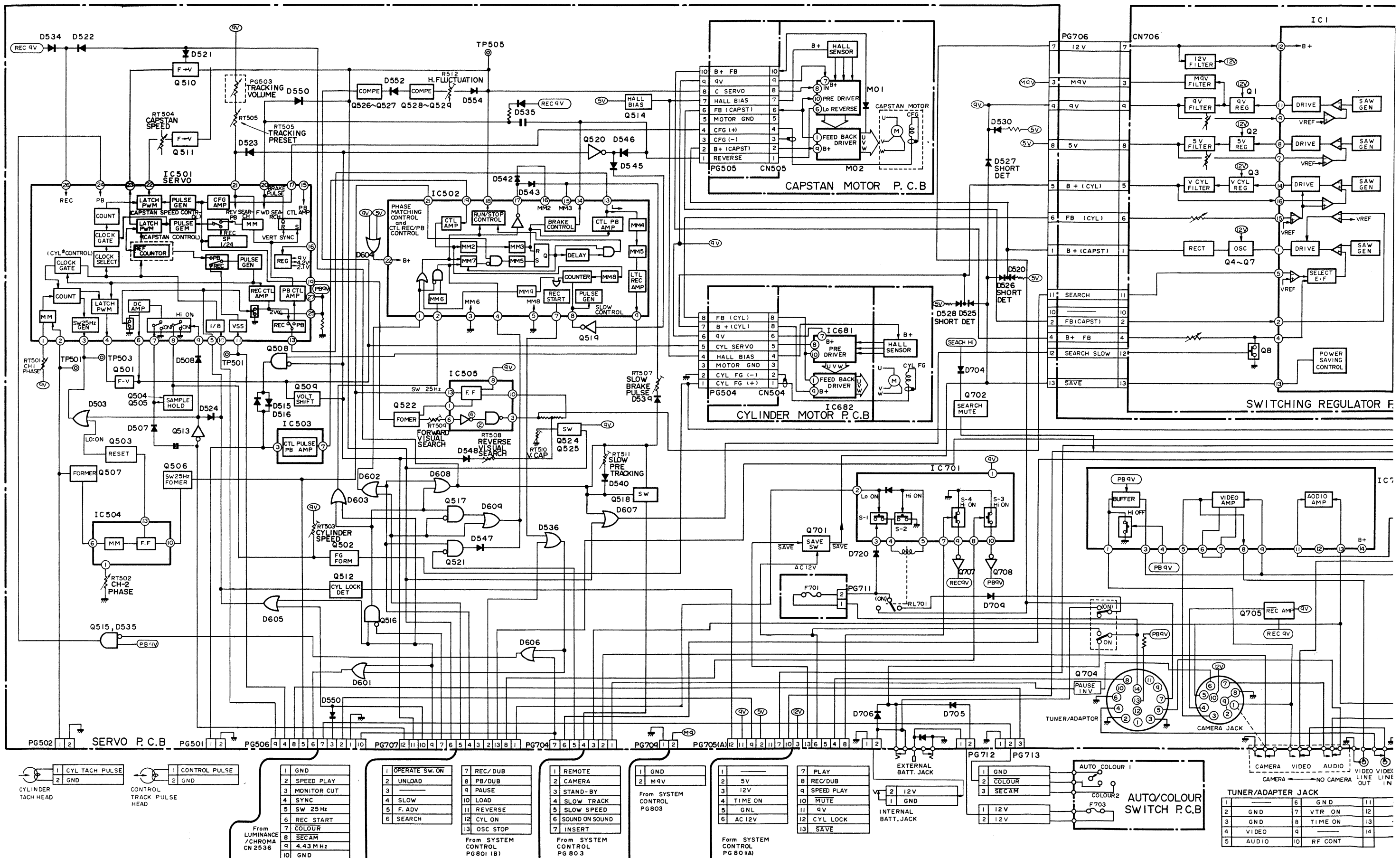
Cautions on use of MOS IC

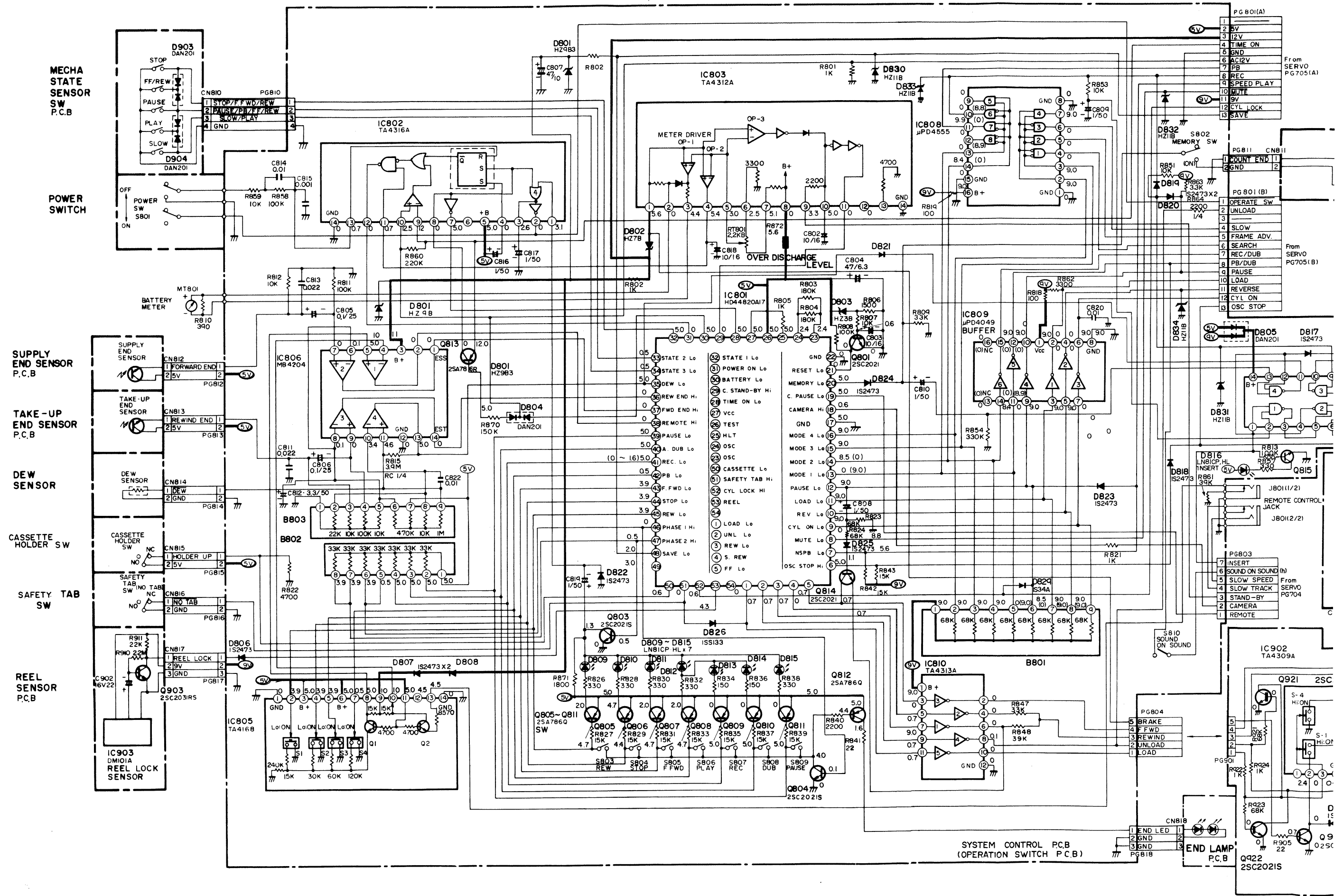
1. The MOS IC is inserted in black foam for shipment. This foam is a conductor which short-circuits between the leads to prevent damage. Do not remove ICs from this foam during their storage. Avoid removing ICs from this foam, placing them on plastic which is likely to be charged with static electricity or inserting them into styrol foam.
2. High voltages may be applied during soldering caused by leakages from the soldering iron, so be sure to ground the tip of the soldering iron or use a low voltage soldering iron.
3. The human body, clothes made of synthetic fibres or nylon gloves may be charged with several thousands volts of static electricity because of friction, so a workers should be grounded.
4. Be sure to ground measuring instruments such as oscilloscopes, VTVMs, etc. used for repairs.

OVERALL BLOCK DIAGRAM (VT-6500E)









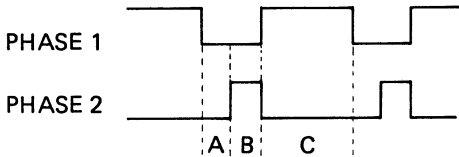
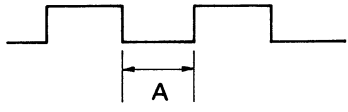
Microprocessor (μP) input/output table

This table shows the levels and functions of the microprocessor input and output which are used in the system control circuit.

How to read the table

PIN NO.	I/O	Active level	Abbreviation	Function
Pin No.	Input/output pin I: Input O: Output I/O: In common with input/output	Level in execution of specified operation Hi, Lo	Abbreviation of operation excuted during Pin input/output	Operation related to pin input/output

PIN NO.	I/O	Active level	Abbreviation	Function
1	I/O	Lo	LOAD (Loading)	Loading motor control
2			UNL (Unloading)	* -1
3			S. REW (Slow rewind)	Reel motor control
4			REW (Rewind)	* -2
5			FF (Fast forward)	
6		Hi	OSC STOP	Stops bias oscillation of audio circuit in modes other than REC, Audio dubbing modes.
7		Lo	NSPB (Non-standard play)	Performs playback at speeds other than standard speed
8			MUTE (mute)	Performs muting temporarily during the period (e.g. during loading/unloading, etc.) until the unit enters the specified mode.
9			CYL ON (Cylinder ON)	Starts cylinder by the specified operation (e.g. play, record)
10			REV (Reverse) * -3	Rotates capstan motor in reverse
11			LOAD (Loading)	Performs monitor-cut during loading period
12			PAUSE (Pause)	Operation mode
13			MODE 1	output * -4
14			MODE 2	
15			MODE 3	
16			MODE 4	
17		Lo	EP (6HR)	Programs 6 Hr data in μP
18		Hi	CAMERA (Camera)	Feeds camera connection data into μP
19		Lo	C. PAUSE (Camera pause)	Feeds camera pause data into μP
20		Lo	MEMORY (Memory)	Feeds memory end data into μP
21		Lo	RESET (Reset)	Performs resetting during power set up
28		Lo	TIME ON (Time ON)	Feeds Timer recording period into μP
29		Hi	C. STANDBY (Camera stand by)	Feeds Camera standby mode into μP
30	I/O	Lo	BATTERY (Battery)	Inputs type of power supply (Lo: DC)
31		Lo	POWER ON (Power ON)	Inputs power switch state

PIN NO.	I/O	Active level	Abbreviation	Function
32	I/O	Lo	STATE 1	Inputs guide roller position * -5
33		Lo	STATE 2	
34		Lo	STATE 3	
35		Lo	DEW	Inputs dew data
36		Hi	REW END (Rewind end)	Inputs rewind completion
37	I/O	Hi	FWD END (Forward end)	Inputs forward completion
38		Hi	REMOTE (Remote)	Inputs data remote control operation button
39		Lo	PAUSE (Pause)	Inputs operation button data, retains output
40			A. DUB (Audio dubbing)	
41			REC (Record)	
42	I/O	Lo	PB (Play)	Inputs operation button in, retaining output and
43			F. FWD (Fast forward)	
44			STOP (Stop)	outputting D/A code
45			REW (Rewind)	
46	O	Hi	PHASE 1 (Phase 1)	Inputs operation button data
47	O	Hi	PHASE 2 (Phase 2)	Lighting mode indicator and retaining power state
<div><div>PHASE 1</div><div>PHASE 2</div><div></div></div> <div>Section A: Remote control button input Section B: Operation button input Section C: Driving mode indicator</div>				
48	O	Lo	SAVE (Save)	Executes power-save mode
50	I	Lo	CASSETTE (Cassette)	Inputs cassette holder closed
51	I	Hi	SAFETY TAB (Safety tab)	Inputs that Safety tab is present
52	I	Hi	CYL LOCK (Cylinder lock)	Inputs cylinder abnormality
53	I	-	REEL (Reel)	Inputs abnormal tape transport condition
<div><div></div><div>More than 3 sec at standard playback Abnormal if more than 1.5 sec at FF/REW, search.</div></div>				

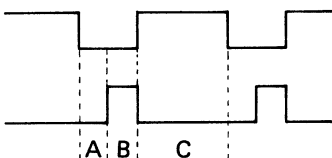
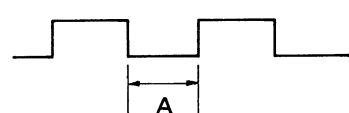
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REC,

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PIN NO.	I/O	Active level	Abbreviation	Function	
32		Lo	STATE 1	Inputs guide roller position * -5	STOP/FF/REW
33		Lo	STATE 2		FF/REW/PAUSE/PB
34		Lo	STATE 3		PB/SLOW
35		Lo	DEW	Inputs dew data	
36		Hi	REW END (Rewind end)	Inputs rewind completion	
37		Hi	FWD END (Forward end)	Inputs forward completion	
38		Hi	REMOTE (Remote)	Inputs data remote control operation button	
39	I/O	Lo	PAUSE (Pause)	Inputs operation button data, retains output	Performs PAUSE
40			A. DUB (Audio dubbing)		Performs audio dubbing
41			REC (Record)		Performs recording
42			PB (Play)	Inputs operation button in, retaining output and outputting D/A code	Performs play
43			F. FWD (Fast forward)		Performs fast-forward
44			STOP (Stop)		Performs stop
45			REW (Rewind)		Performs rewind
46	O	Hi	PHASE 1 (Phase 1)	Inputs operation button data	
47	O	Hi	PHASE 2 (Phase 2)	Lighting mode indicator and retaining power state	
<div><div><div>PHASE 1</div><div>PHASE 2</div><div></div></div><div>Section A: Remote control button input Section B: Operation button input Section C: Driving mode indicator</div></div>					
48	O	Lo	SAVE (Save)	Executes power-save mode	
50	I	Lo	CASSETTE (Cassette)	Inputs cassette holder closed	
51	I	Hi	SAFETY TAB (Safety tab)	Inputs that Safety tab is present	
52	I	Hi	CYL LOCK (Cylinder lock)	Inputs cylinder abnormality	
53	I	—	REEL (Reel)	Inputs abnormal tape transport condition	
<div><div><div></div></div><div>More than 3 sec at standard playback Abnormal if more than 1.5 sec at FF/REW, search.</div></div>					

The table below shows the relationship between the input and output concerning the operation buttons during the μ P operation. Factors concerning the operations marked * -1 to -5 in the previous table are listed in this table.

Table 3

		IC901										MODE				STATE		
				LOAD	UNL	SREW	REW	FF	REV	PAUSE		1	2	3	4	1	2	3
				1	2	3	4	5	10	12		13	14	15	16	32	33	34
Steady operation	STOP	Stop														Lo		
		Pause								Lo						Lo		
	FF							Lo								Lo	Lo	
	REW					Lo	Lo									Lo	Lo	
	PLAY	Play										Lo					Lo	Lo
		Still								Lo		Lo						Lo
		Frame advance										Lo		Lo				
		Slow										Lo			Lo			Lo
		Fast Forward-search										Lo		Lo	Lo		Lo	Lo
		Rewind search					Lo		Lo			Lo		Lo	Lo		Lo	Lo
	RECORD	Record											Lo				Lo	Lo
		Pause								Lo		Lo					Lo	
	AUDIO DUBBING	Audio dubbing										Lo	Lo				Lo	Lo
		Pause								Lo		Lo	Lo				Lo	
	Video dubbing												Lo				Lo	Lo
Transient operation	Loading		Lo													Lo	→	Lo
	Unloading			Lo	Lo											Lo	←	Lo
	Record Pause			Lo	Lo				Lo	Lo							Lo	←

MOTOR DRIVER

OTOR

q11

GND
LOADING
UNLOADING

q01

LOAD
UNLOAD
REWIND
F. FWD
BRAKE

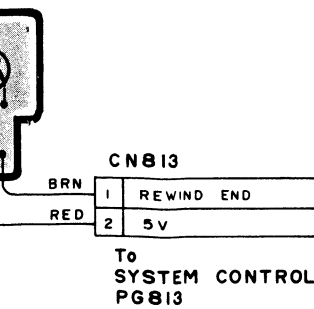
q02

GND
M QV

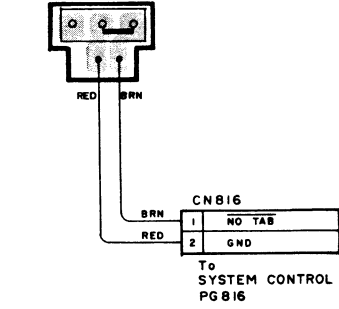
q10

GND
REW
F.FWD
M QV

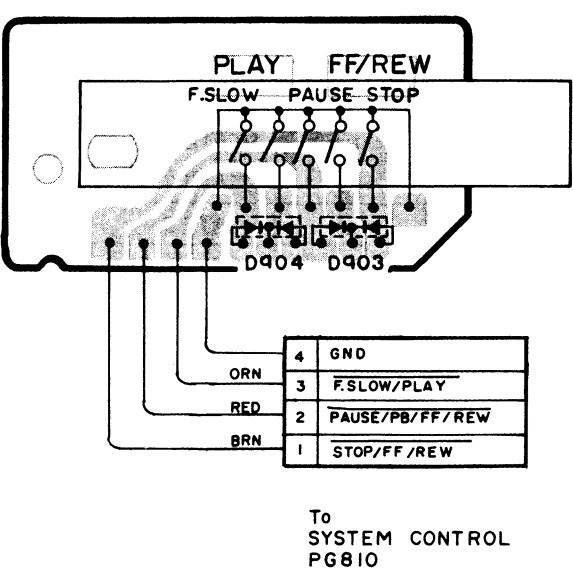
UP END SENSOR P.C.B



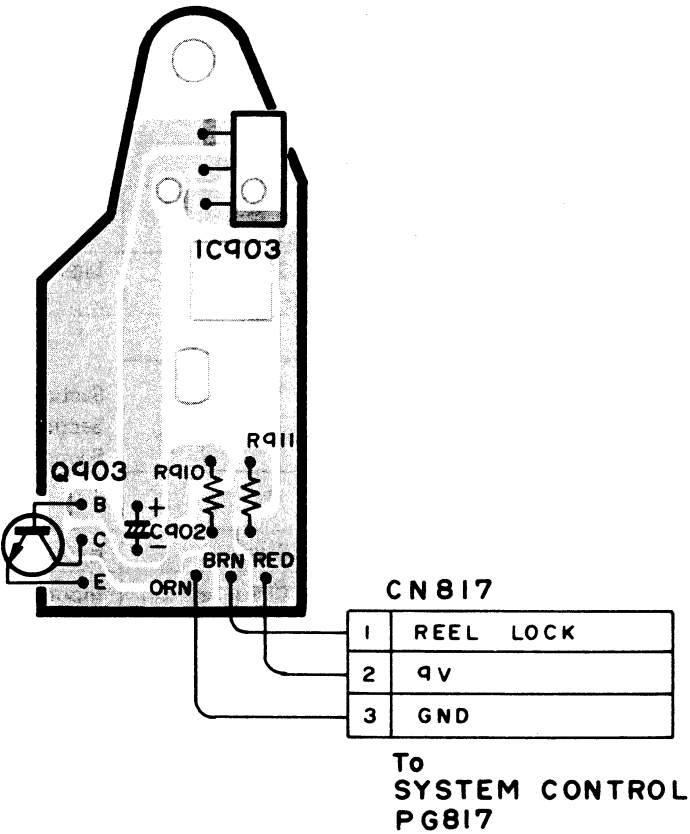
SAFETY TAB SW P.C.B



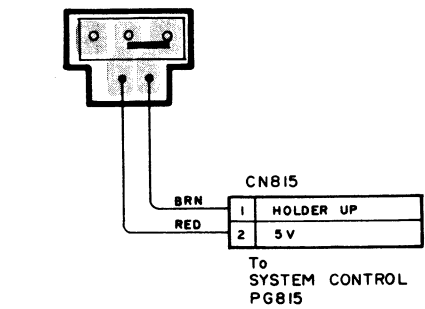
MECHA STATE SENSOR SW P.C.B



REEL SENSOR P.C.B



CASSETTE HOLDER SW P.C.B



IC801

1	0.7	11	Q.0	21	0	31	0	41	5.0 (0-1.6)	51	0
2	Q.7	12	Q.0	22	0	32	5.0	42	0.5	52	0.6
3	0.7	13	0 (Q.0)	23	2.4	33	0.5	43	3.9	53	4.3
4	0	14	8.5 (0)	24	2.4	34	0.5	44	3.9	54	0
5	0.7	15	Q.0	25	5.0	35	5.0	45	3.9		
6	5.0	16	Q.0	26	5.0	36	0	46	0		
7	5.6	17	5.0	27	5.0	37	0	47	0.5		
8	8.8	18	0.6	28	5.0	38	0	48	2.0		
9	0	19	5.0	29	0	39	5.0	49	3.0		
10	Q.0	20	5.0	30	5.0	40	5.0	50	0.6		

IC807

14	8.2	1	0
13	1.4	2	0.4
12	0	3	8.5
11	8.6	4	0
10	8.2	5	8.5
9	0.7	6	8.5
8	0	7	0

IC808

8	0	9	0
7	Q.0	10	0(8.8)
6	0	11	99(0)
5	0	12	0
4	0	13	0(8.9)
3	Q.0	14	84(0)
2	Q.0	15	0
1	0	16	Q.0

IC802

14	13	12	11	10	9	8	7	6	5	4	3	2	1
0	0.7	0	0.7	12.5	12	0	5.0	—	5.1	0	2.6	0	3.1

IC806

1	2	3	4	5	6	7
0	0	11	10	5.0	0.1	0
14	13	12	11	10	9	8
0	5.0	0	4.6	3.4	0	0.1

IC809

1	2	3	4	5	6	7	8
Q.0	0	Q.0	0	Q.0	Q.0	0	0
16	15	14	13	12	11	10	9
0	Q.0(0)	84(0)	0	0(Q.0)	0(8.9)	0	Q.0

IC805

1	2	3	4	5	6	7	8	9	10	11	12	13	14
0	3.9	5.0	3.9	3.9	5.0	0.5	5.0	10	10	5.0	4.5	4.5	0

Q807

B	4.7
C	2.0
E	5.0

Q808

B	4.7
C	0
E	5.0

Q809

B	5.0
C	0
E	5.0

Q810

B	5.0
C	0
E	5.0

Q811

B	5.0
C	0
E	5.0

Q812

B	4.4
C	1.6
E	5.0

Q813

B	12.0
C	0
E	12.0

IC803

14	13	12	11	10	9	8	7	6	5	4	3	2	1
0	0.5	0.5	0	0.6	0.5	5	3.6	2.2	3.3	5.2	4.2	4.3	5.3

Q801

B	0.6
C	0
E	0

Q802

B	0
C	5.0
E	0

Q803

B	0.5
C	1.3
E	0

Q804

B	0.1
C	4.0
E	0

Q805

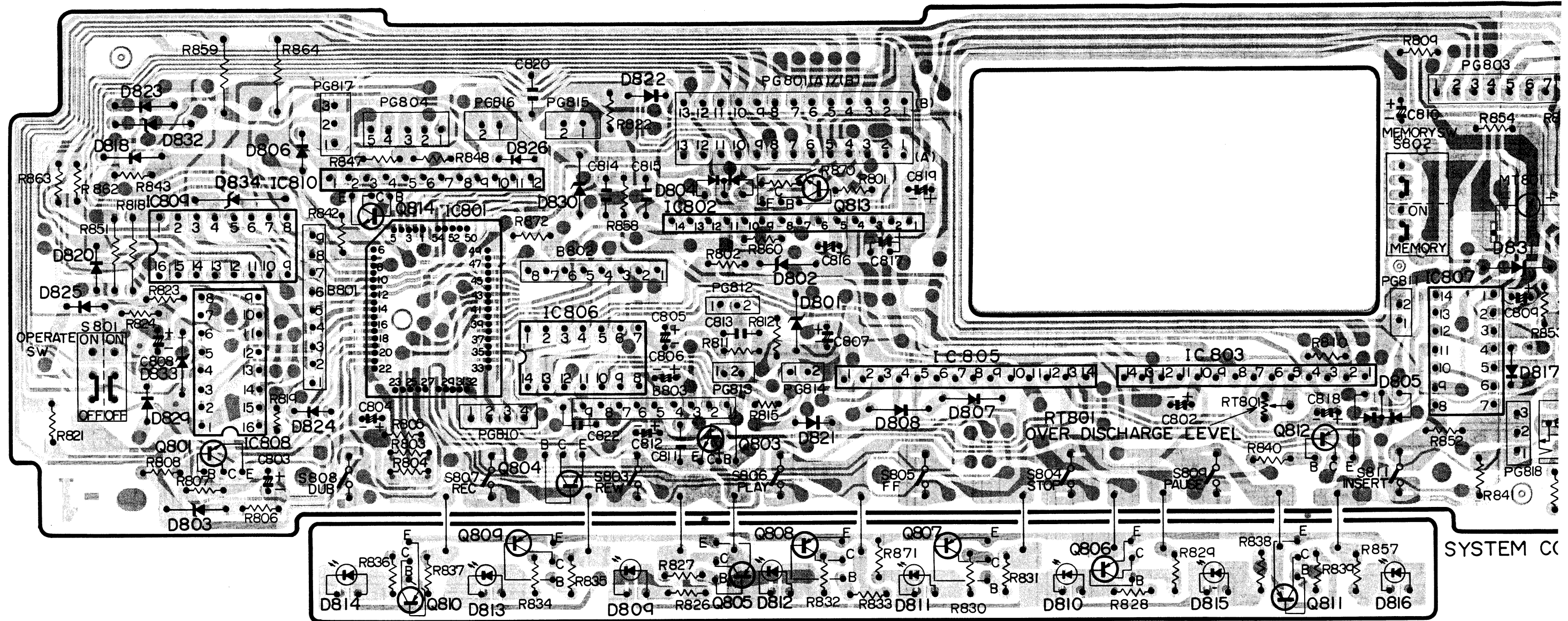
B	4.7
C	2.0
E	5.0

Q806

B	4.4
C	4.7
E	5.0

Q814

B	0
C	0.7
E	0



OPERATION SWITCH P.C.B

PG 801 (A)

1	—
2	5V
3	12V
4	TIME ON
5	GND
6	AC12V
7	PB
8	REC
9	SPEED PLAY
10	MUTE
11	9V
12	CYL LOCK
13	SAVE

From SERVO
PG 705

PG 801 (B)

1	POWER SW
2	UN LOAD
3	—
4	SLOW
5	FRAME ADV.
6	SEARCH
7	REC/DUB
8	PB/DUB
9	PAUSE
10	LOAD
11	REVERSE
12	CYL ON
13	OSC STOP

From SERVO
PG707

PG803

1	REMOTE
2	CAMERA
3	STAND-BY
4	SLOW TRACK
5	SLOW SDEED
6	SOUND ON SOUND
7	INSERT

From SERVO
PG 704

PG 804

1	BRAKE
2	F.FWD
3	REWIND
4	UNLOAD
5	LOAD

From
LOADING MOTOR DRIVER
PG901

PG 810

1	STOP/FFWD/REW
2	PAUSE/PB/FF/REW
3	SLOW/PLAY
4	GND

From
MECHA STATE SENSOR SW
CN 810

PG811

1	GND
2	COUNT END

From
TAPE COUNTER
CN811

PG812

1	FORWARD END
2	5V

From
SUPPLY END SENSOR
CN 812

PG81

1	REWIND
2	5V

From
TAKE UP
CN813

PG 817

1	REEL LOCK
2	9V
3	GND

From REEL SENSOR
CN 817

PG 818

1	END LED
2	GND
3	GND

END LAMP
CN 818

PG814

1	DEW
2	GND

From DEW SENSOR
CN814

PG 815

1	HOLDER UP
2	5V

From
CASSETTE HOLDER SWITCH
CN815

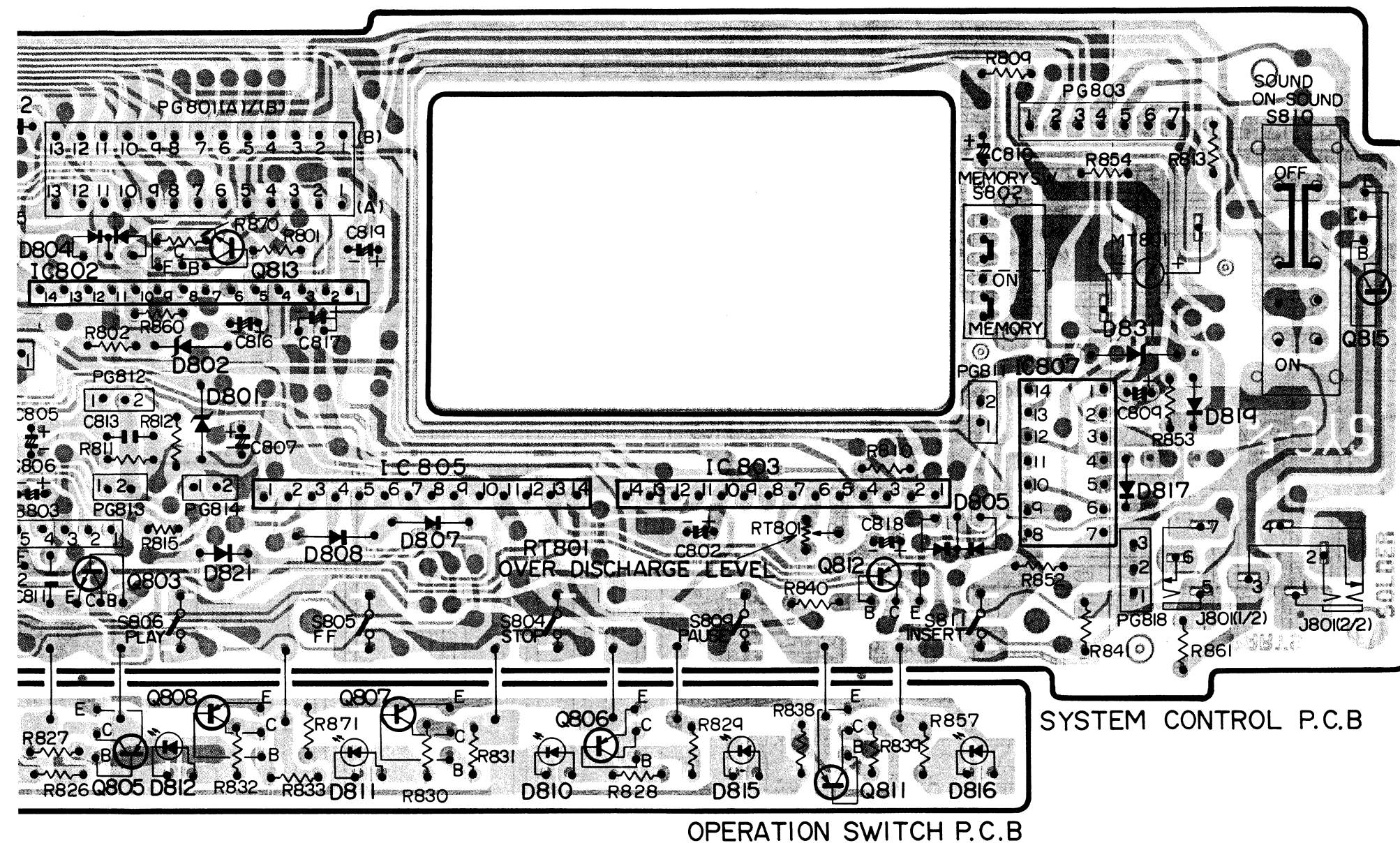
PG 8

1	TAB
2	GND

From
SAFTY D
CN816

: Soldered side

: Parts side



SYSTEM CONTROL P.C.B

OPERATION SWITCH P.C.B

PG804

1	BRAKE
2	F.FWD
3	REWIND
4	UNLOAD
5	LOAD

From
LOADING MOTOR DRIVER
PG901

PG810

1	STOP/F.FWD/REW
2	PAUSE/PB/FF/REW
3	SLOW/PLAY
4	GND

From
MECHA STATE SENSOR SW
CN810

PG811

1	GND
2	COUNT END

From
TAPE COUNTER
CN811

PG812

1	FORWARD END
2	5 V

From
SUPPLY END SENSOR
CN812

PG813

1	REWIND END
2	5 V

From
TAKE UP END SENSOR
CN813

PG817

1	REEL LOCK
2	9 V
3	GND

From REEL SENSOR
CN817

PG818

1	END LED
2	GND
3	GND

END LAMP
CN818

PG814

1	DEW
2	GND

From DEW SENSOR
CN814

PG815

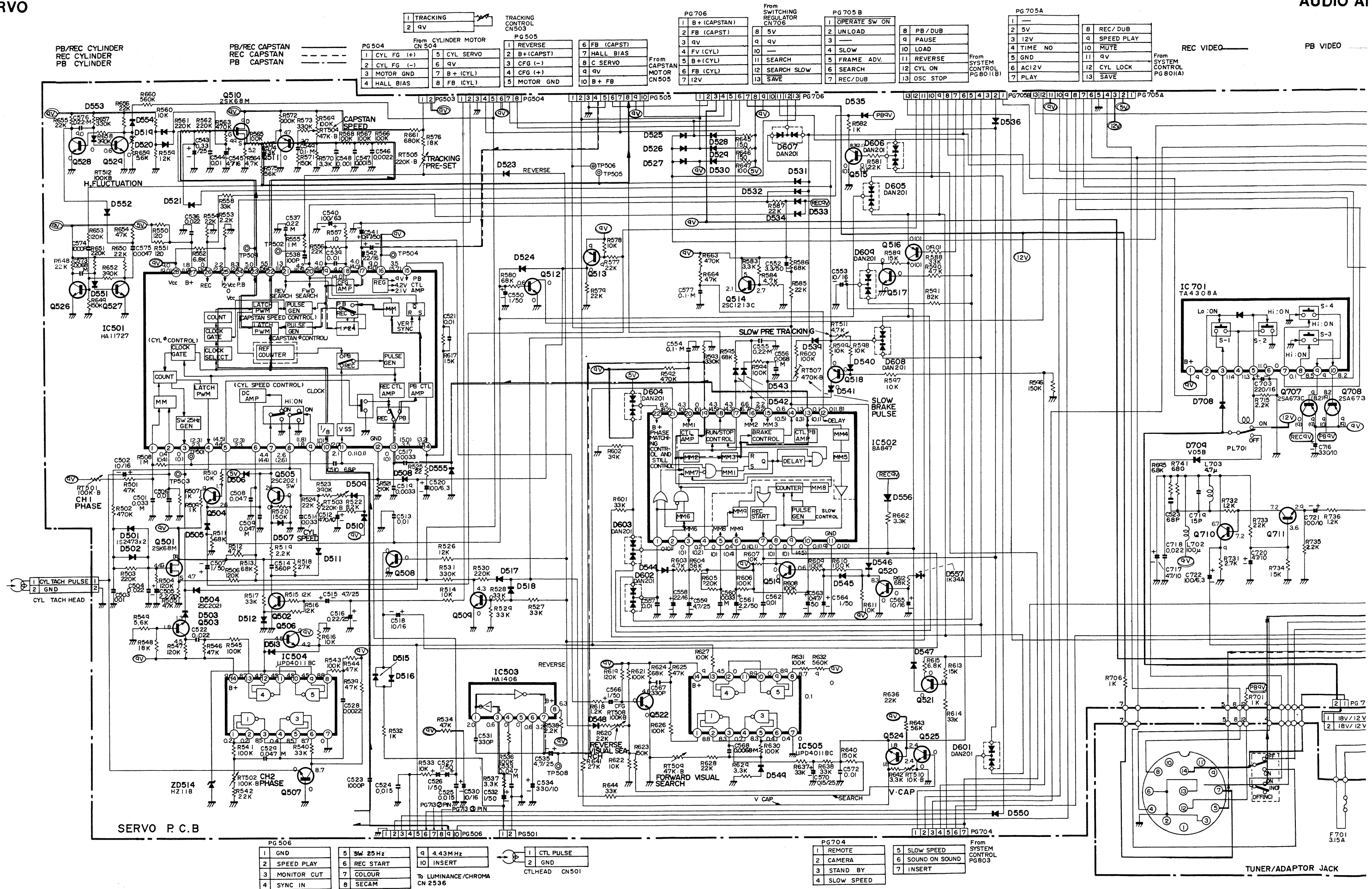
1	HOLDER UP
2	5 V

From
CASSETTE HOLDER SWITCH
CN815

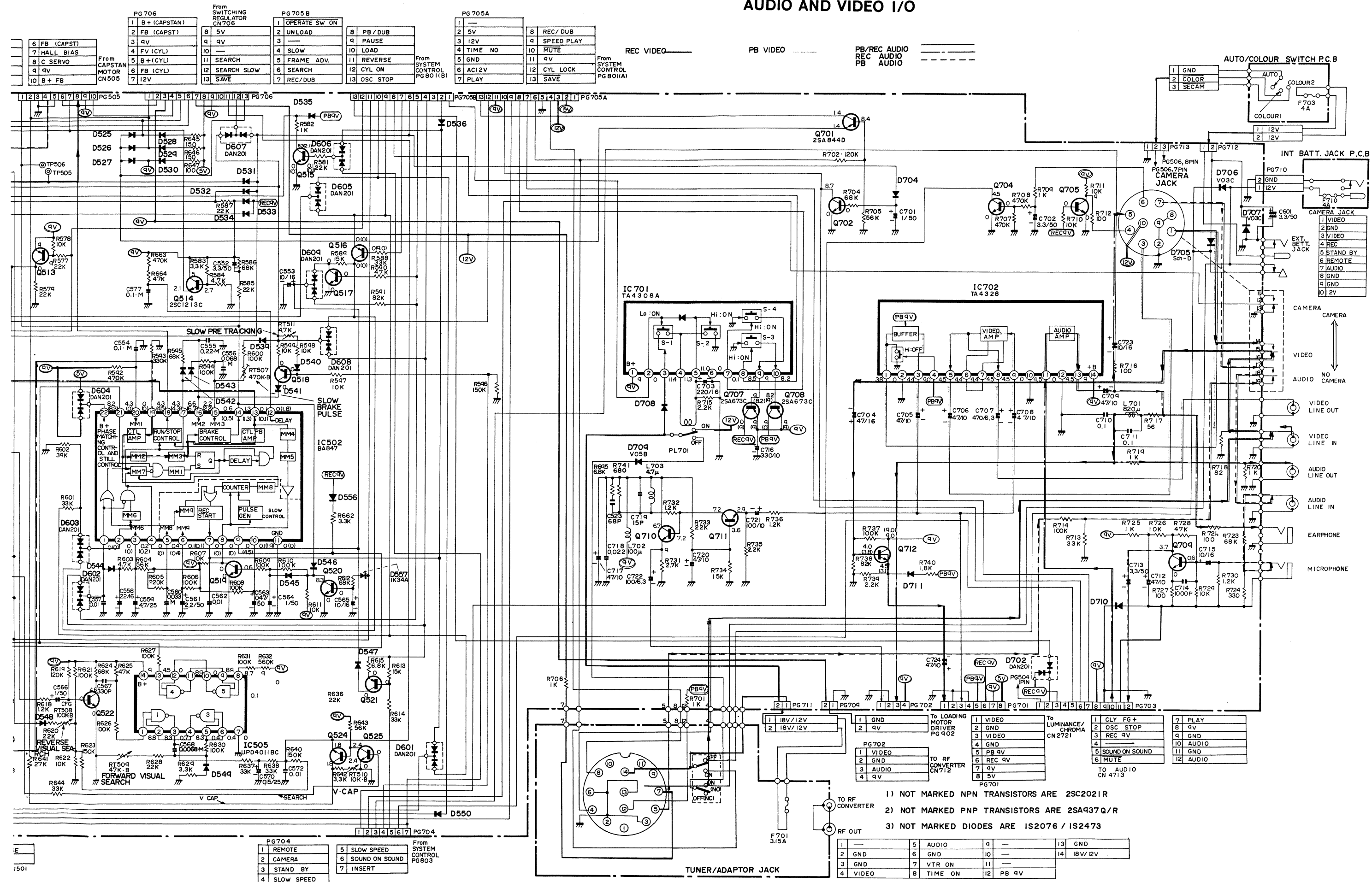
PG816

1	TAB
2	GND

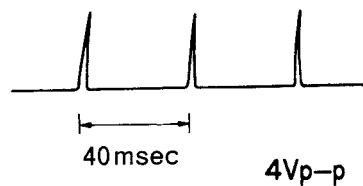
From
SAFTY DUB SWITCH
CN816



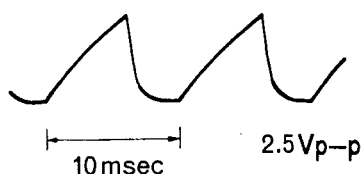
AUDIO AND VIDEO I/O



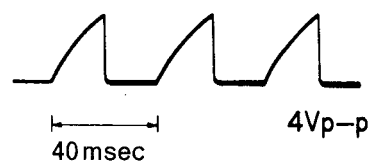
IC501-1 PB/REC



IC501-8 PB/REC



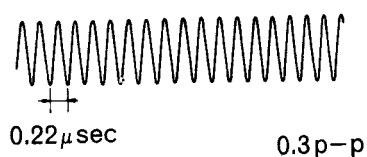
IC501-21 PB/REC



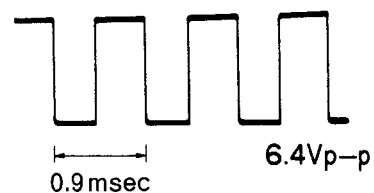
IC501-2 PB/REC



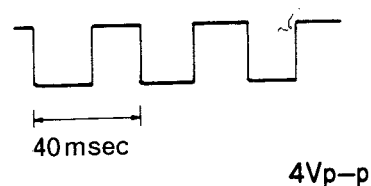
IC501-10 PB/REC



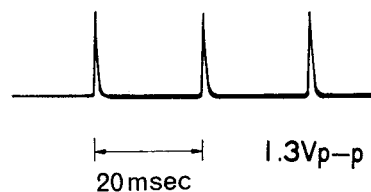
IC501-23 PB/REC



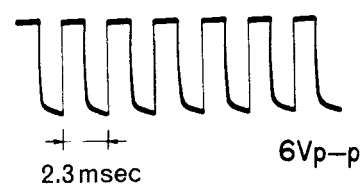
IC501-3 PB/REC



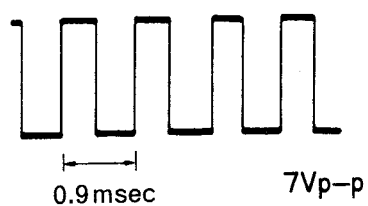
IC501-11 PB/REC



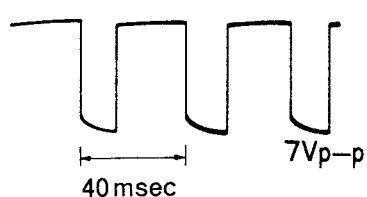
IC501-22 PB/REC



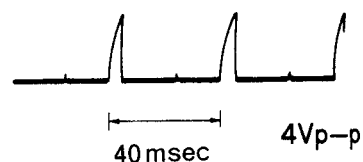
IC501-4 PB/REC



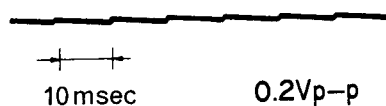
IC501-13 REC



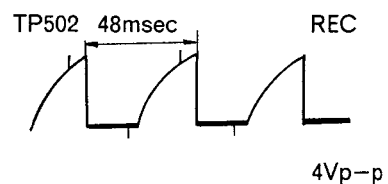
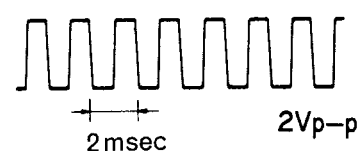
TP501 PB/REC



IC501-6 PB/REC



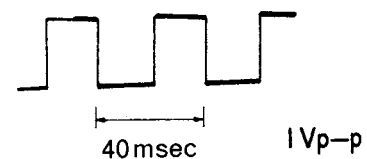
IC501-19 PB/REC



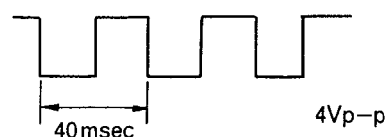
IC501-7 PB/REC



IC501-20 REC



TP503 PB/REC



IC503

8	6.3
7	3.2
6	0.6
5	0
4	0
3	0.6
2	—
1	2.0

IC504

8	9	10	11	12	13	14
8.8	4.5	4.5	4.5	4.5	8.7	9.0
7	6	5	4	3	2	1
0	8.7	8.5	0.4	8.5	0.2	0.2

IC505

8	9	10	11	12	13	14
8.7	8.9	0	8.9	0	4.5	9
7	6	5	4	3	2	1
0	0.4	0.4	8.3	0.7	8.3	8.8

IC501

15	16	17	18	19	20	21	22	23	24	25	26	27	28
3.5(3.7)	9.0(9.0)	4.0(4.0)	4.0(4.0)	4.0(4.0)	4.2(5.5)	1.3(1.0)	3.5(3.6)	5.0(5.0)	8.3(2.1)	2.2(2.1)	0(3.0)	1.8(1.8)	9.0(9.0)
14	13	12	11	10	9	8	7	6	5	4	3	2	1
3.5(3.2)	3.5(5.0)	0(0)	0(1.0)	2.0(2.0)	0(1.0)	1.8(1.8)	2.6(2.6)	4.4(4.4)	2.3(2.3)	4.4(4.5)	2.3(2.2)	0(0)	0(10.4)

IC502

12	13	14	15	16	17	18	19	20	21	22
0(1.8)	0(1.0)	1.3(1.3)	0.8(0.5)	2.2(2.2)	6.6(5.7)	4.3(4.3)	4.3(4.5)	0(0)	4.3(0)	8.2(8.2)
11	10	9	8	7	6	5	4	3	2	1
0(0)	0(1.1A)	0(4.5)	0(0)	0(0)	0(1.0)	0(4.0)	0(0)	0(2.0)	0(0)	0(0)

IC702

1	2	3	4	5	6	7	8	9	10	11	12	13	14
3.8	0	4.4	9.0	4.5	4.4	4.4	4.5	4.5	0	4.5	0	4.5	9

IC701

10	9	8	7	6	5	4	3	2	1
8.2	9	8.5	0.1	0	11.0	11.3	11.4	0	9

PG701

1	VIDEO
2	GND
3	VIDEO
4	GND
5	PB 9V
6	REC 9V
7	9V
8	5V

From
LUMINANCE/CHROMA
CN 2721

PG702

1	VIDEO
2	GND
3	AUDIO
4	RF 9V

From
RF CONVERTOR
PG 712

PG703

12	AUDIO
11	GND
10	AUDIO
9	GND
8	9V
7	PLAY
6	MUTE
5	SOUND ON SOUND
4	—
3	REC 9V
2	OSC STOP
1	CYL FG +

From
AUDIO
CN4713

PG704

1	REMOTE
2	CAMERA
3	STAND-BY
4	SLOW TRACK
5	SLOW SPEED
6	SOUND ON SOUND
7	INSERT

From
SYSTEM CONTROL
PG803

PG705(A)

13	SAVE
12	CYL LOCK
11	9V
10	MUTE
9	SPEED PLAY
8	REC/DUB
7	PLAY
6	AC 12V
5	GND
4	TIME ON
3	12V
2	5V
1	—

From
SYSTEM CONTROL
PG801(A)

PG706

1	B+ (CAPST)
2	FB (CAPST)
3	M 9V
4	B+ FB
5	B+ (CYL)
6	FB (CYL)
7	12V
8	5V
9	9V
10	—
11	SEARCH
12	SEARCH SLOW
13	SAVE

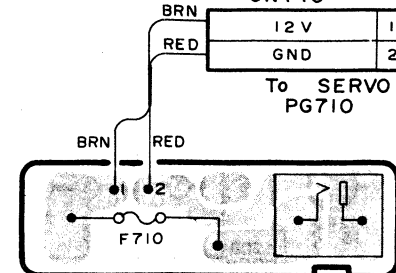
From
SWITCHING REGULATOR
CN706

PG705B

1	POWER SW
2	UNLOAD
3	—
4	SLOW
5	FRAME ADV.
6	SEARCH
7	REC/DUB
8	PB/DUB
9	PAUSE
10	LOAD
11	REVERSE
12	CYL ON
13	OSC STOP

From
SYSTEM CONTROL
PG801(B)

CN710



INTERNAL BATTERY JACK P.C.B

PG713

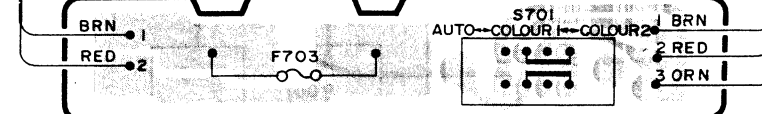
BRN	GND	1
RED	COLOUR	2
ORN	SECAM	3

From SERVO
CN713

PG712

BRN	12V	1
RED	12V	2

From SERVO
CN712



AUTO COLOUR SWITCH P.C.B

CN503

1	TRACKING	1
2	9V	2

PG503

PG709

1	GND
2	M 9V

From
LOADING MOTOR DRIVER
PG902

PG710

1	12V
2	GND

From
INT. BATT. JACK
CN710

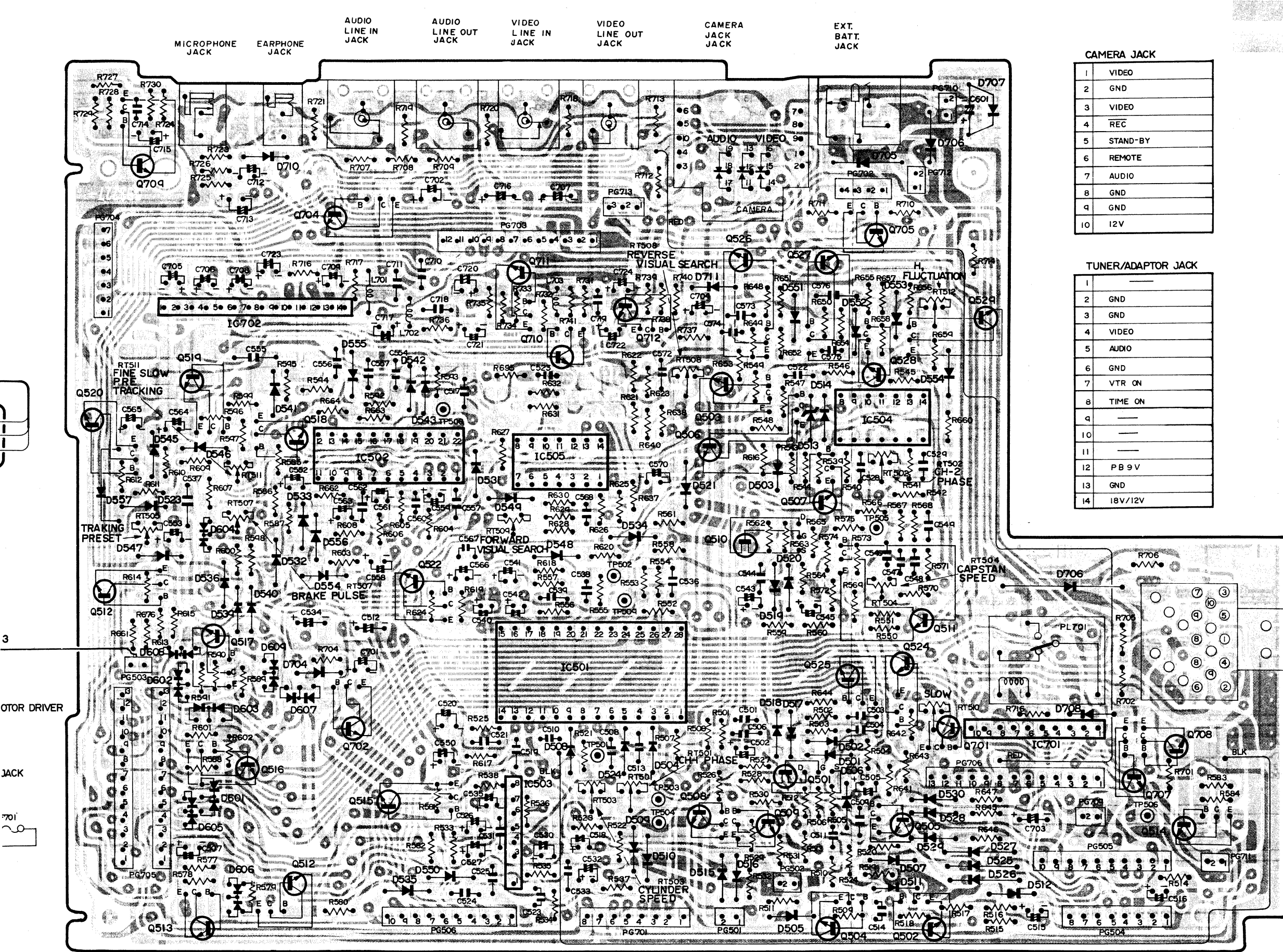
PG711

1	18V/12V
2	18V/12V

F701

* VOLTAGES ARE MEASURED IN PLAY MODE, AND
VOLTAGES IN () ARE MEASURED IN RECORD MODE.

Q501 B 4.4 D 9 S 4.7	Q502 B 0.4 C 5.3 E 0	Q503 B 1.8 C 4.5 E 1.3	Q504 B 1.7 C 9 E 2.6	Q505 B 0 C 2.6 E 0	Q506 B 4.5 C 9 E 4.2	Q507 B 0 C 8.7 E 0	Q508 B 0 C 0 E 0	Q509 B 0 C 4.3 E 0
Q510 B 4.9 D 9 S 5.2	Q511 B 3.7 C 0 E 4.7	Q512 B 0.6 C 0 E 0	Q513 B 9 C 0 E 9	Q514 B 2.7 C 5 E 2.1	Q515 B 0.1(0.1) C 8.3(2.1) E 0(0)	Q516 B 0(9.0) C 0(0) E 0(0)	Q517 B 0 C 0 E 0	Q518 B 0 C 0 E 0
Q519 B 0.6 C 0 E 0	Q520 B 0 C 8.3 E 0	Q521 B 0 C 0 E 0	Q522 B 0 C 4.6 E 0	Q523 B 0 C 9 E 0.1	Q524 B 2.4 C 1.8 E 1.8	Q525 B 0 C 2.4 E 0	Q526 B 0 C 9.0 E 0	Q527 B 0.6 C 0 E 0
Q528 B 0 C 9.0 E 0	Q529 B 0.6 C 0 E 0	Q701 B 8.4 C 1.4 E 1.4	Q702 B 0 C 8.7 E 0	Q704 B 0 C 4.5 E 0	Q705 B 0 C 9 E 0	Q707 B 0(8.2) C 0(9) E 9(9)	Q708 B 8.2(9) C 9(0) E 9(9)	Q709 B 0.6 C 3.7 E 0
Q710 B 7.2 C 6.7 E 9	Q711 B 3.6 C 7.2 E 2.9	Q712 B 4.0(3.8) C 9.0(9.0) E 4.5(3.1)						



: Soldered side

: Parts side

The holes of which surroundings are registered through-hole type.

CAMERA JACK

1	VIDEO
2	GND
3	VIDEO
4	REC
5	STAND-BY
6	REMOTE
7	AUDIO
8	GND
9	GND
10	12V

TUNER/ADAPTOR JACK

1	—
2	GND
3	GND
4	VIDEO
5	AUDIO
6	GND
7	VTR ON
8	TIME ON
9	—
10	—
11	—
12	PB 9V
13	GND
14	18V/12V

PG501

1	CONTROL PULSE	From CTL HEAD CN501
2	GND	

PG502

1	CYL TACH PULSE	From CYL TACH HEAD CN502
2	GND	

PG503

1	TRACKING	From TRACKING CONTROL CN503
2	9V	

PG504

1	CYL FG (+)	From CYLINDER MOTOR CN504
2	CYL FG (-)	
3	MOTOR GND	
4	HALL BIAS	
5	CYL SERVO	
6	9V	
7	B+ (CYL)	
8	FB (CYL)	

PG505

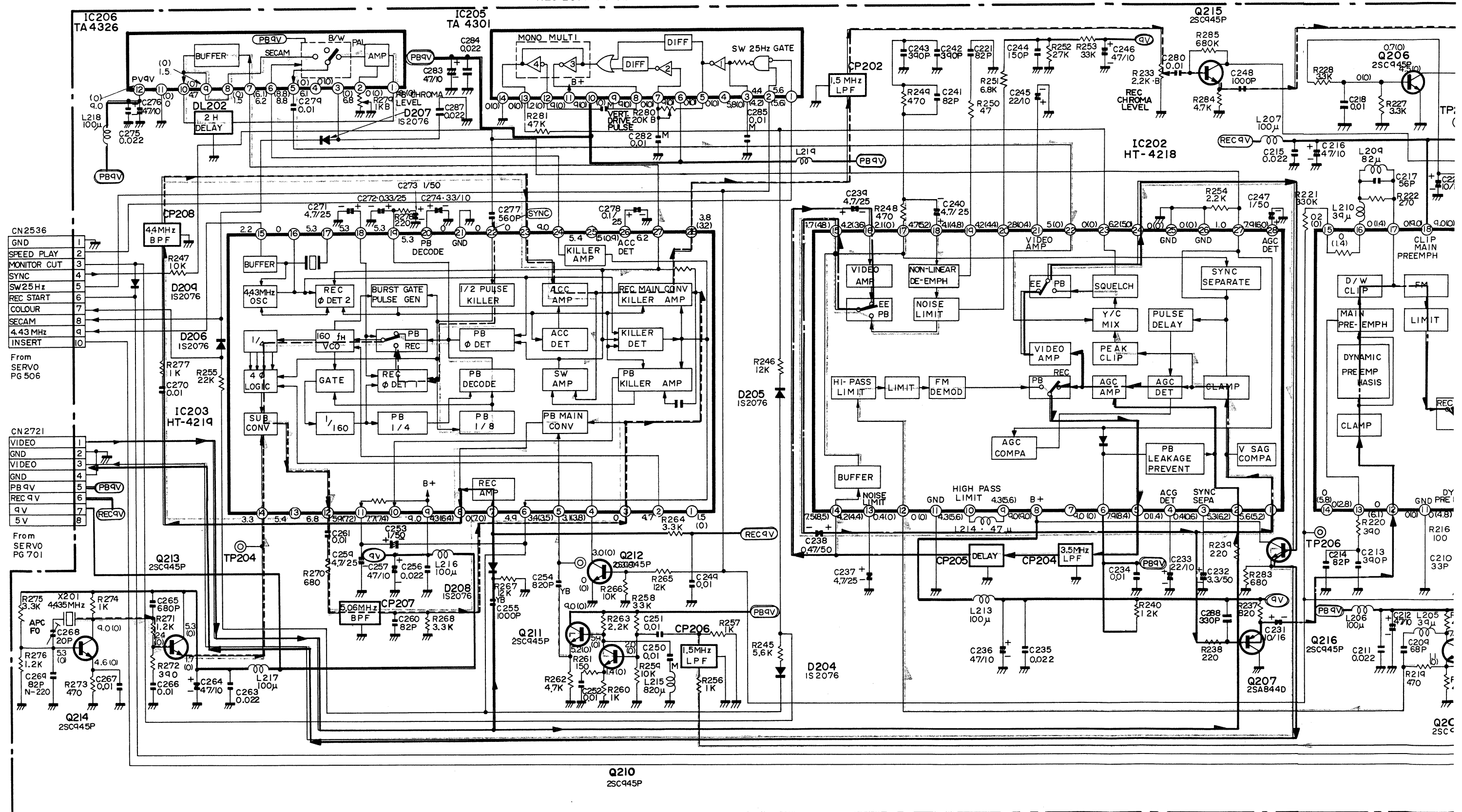
1	REVERSE	From CAPSTAN MOTOR CN505
2	B+ (CAPST)	
3	CFG (-)	
4	CFG (+)	
5	MOTOR GND	
6	FB (CAPST)	
7	HALL BIAS	
8	C. SERVO	
9	9V	
10	B+ FB	

PG506

1	GND	To LUMINANCE/CHROMA CN2536
2	SPEED PLAY	
3	MONITOR CUT	
4	SYNC	
5	SW 25 Hz	
6	REC START IN	
7	COLOUR OUT	
8	SECAM	
9	4.43 MHz	
10	INSERT	

REC/EE VIDEO
REC CHROMA
REC LUMINANCE

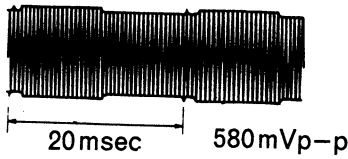
PB VIDEO
PB CHROMA
PB LUMINANCE



LUMINANCE/CHROMA

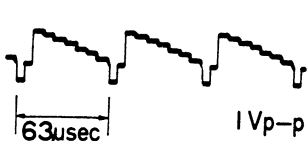
TP201

REC



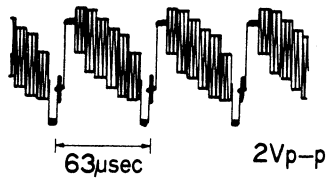
IC201-12

REC



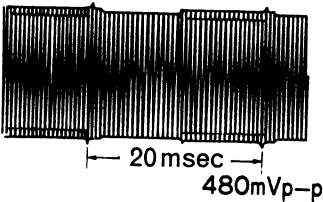
Q216-E

REC



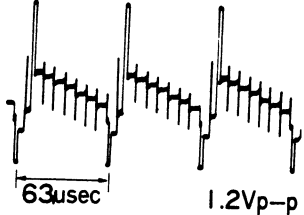
TP202

REC



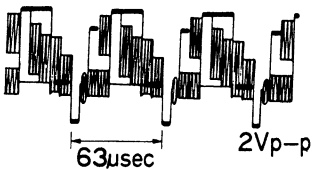
IC201-16

REC



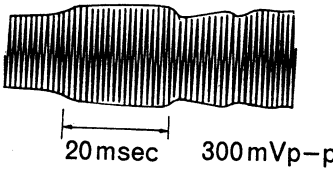
Q216-E

PB



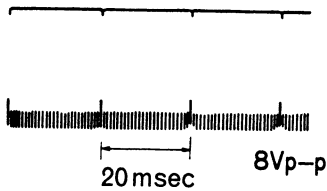
TP203

PB



IC202-27

REC



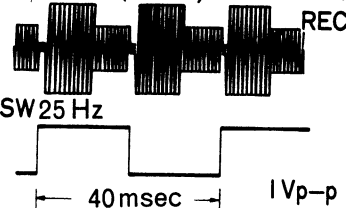
TP204

4.435572 MHz



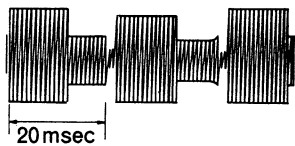
IC203-28(CH-1)

REC



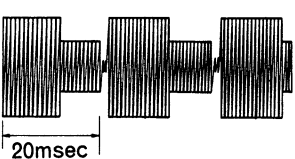
TP205

0.6Vp-p



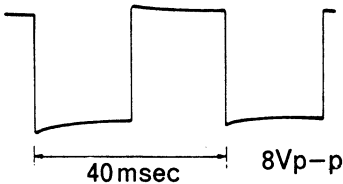
IC206 ⑤

350mVp-p



TP206(SW25)

PB



IC 201			
28	—	1	4.8(5.6)
27	—	2	0(0)
26	—	3	8.2(0)
25	—	4	9.0(0)
24	—	5	0(0)
23	0.6(0)	6	0(0)
22	0(0)	7	0.7(0)
21	0.6(0)	8	0(0)
20	6.8(0)	9	4.0(0)
19	9.0(0)	10	0(4.8)
18	0(9.0)	11	0(0)
17	0(1.4)	12	0(6.0)
16	0(1.4)	13	0(2.8)
15	0.2(0)	14	0(5.8)

IC202			
14	7.5(8.5)	15	4.7(4.8)
13	4.2(4.4)	16	4.2(3.6)
12	0.4(0)	17	2.1(0)
11	0(0)	18	4.7(5.2)
10	4.3(5.6)	19	4.4(4.8)
9	4.3(5.6)	20	4.2(4.4)
8	9.0(9.0)	21	2.8(0.4)
7	—	22	5.0(0)
6	9.0(0)	23	0(0)
5	7.9(8.4)	24	6.2(5.0)
4	0(1.4)	25	0(0)
3	0.4(0.6)	26	0(0)
2	5.3(6.2)	27	1.0
1	5.6(5.2)	28	7.9(6.0)

IC203			
28	3.8(3.2)	1	1.5(0)
27	6.2	2	4.7
26	1.5(0.9)	3	0
25	5.4	4	3.8(3.1)
24	9.0	5	3.4(3.5)
23	0	6	4.9
22	0	7	0(7.0)
21	0	8	4.3(6.4)
20	5.3	9	9.0
19	5.3	10	7.7(7.4)
18	5.3	11	5.9(7.2)
17	5.3	12	6.8
16	0	13	5.4
15	2.2	14	3.3

IC206

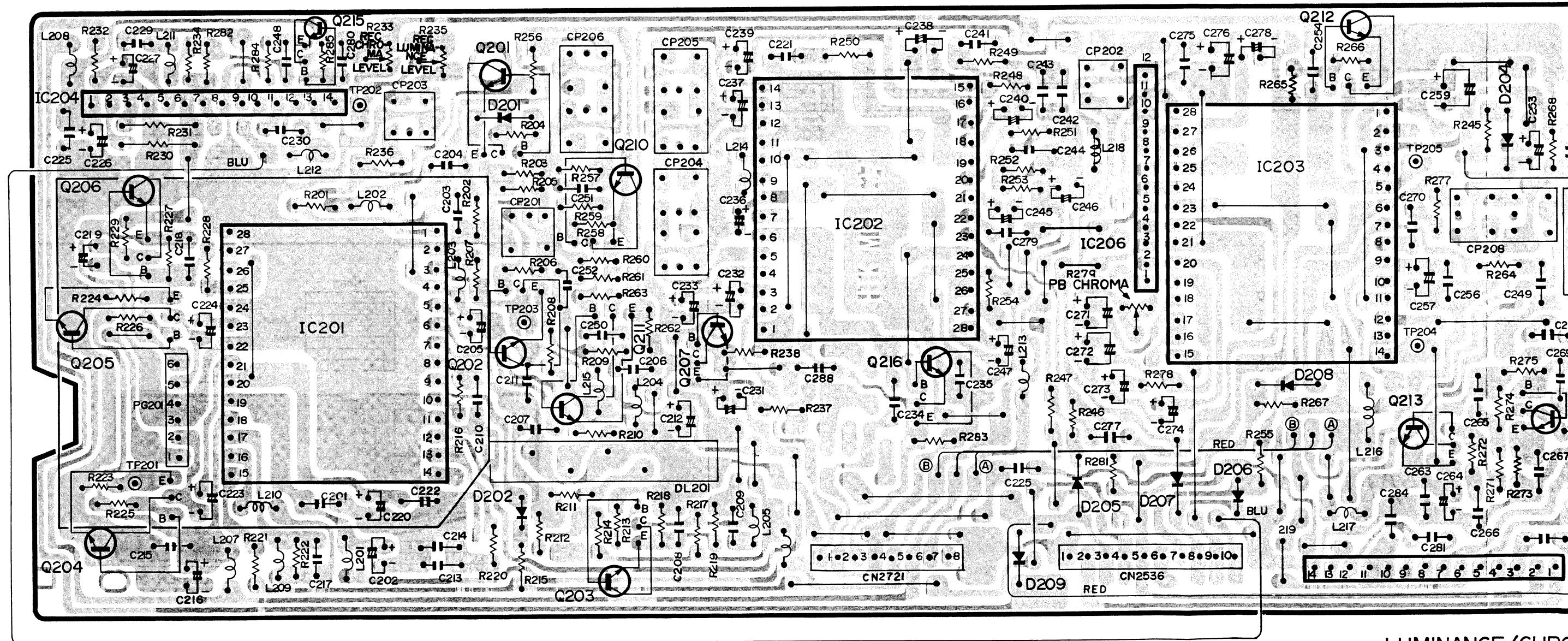
12	9.0(0)
11	0(0)
10	4.7(0)
9	1.5(0)
8	1.5(0)
7	6.2(6.1)
6	8.8(8.8)
5	6.1(0)
4	0(0)
3	6.8(0)
2	0(0)
1	0(0)

IC204

1	2	3	4	5	6	7	8	9	10	11	12	
0(9)	0(4.5)	0(4.5)	0(0)	0(0)	0(4.5)	0(0.3)	0(0)	0(0)	0(0)	0(7.5)	0(1.4)	0

IC205

14	13	12	11	10	9	8	7	6	5	4	3	
0(0)	0(0)	1.2(0)	9(0)	9(0)	—(0)	9(0)	0(0)	9(0)	0(0)	0(0)	5.8(0)	4.4



LUMINANCE/CHRO

IC203

3.8(3.2)	1	1.5(0)
6.2	2	4.7
1.5(0.9)	3	0
5.4	4	3.8(3.1)
9.0	5	3.4(3.5)
0	6	4.9
0	7	0(7.0)
0	8	4.3(6.4)
5.3	9	9.0
5.3	10	7.7(7.4)
5.3	11	5.9(7.2)
5.3	12	6.8
0	13	5.4
2.2	14	3.3

IC206

12	9.0(0)
11	0(0)
10	4.7(0)
9	1.5(0)
8	1.5(0)
7	6.2(6.1)
6	8.8(8.8)
5	6.1(0)
4	0(0)
3	6.8(0)
2	0(0)
1	0(0)

IC204

1	2	3	4	5	6	7	8	9	10	11	12	13	14
0(9)	0(4.5)	0(4.5)	0(0)	0(0)	0(4.5)	0(0.3)	0(0)	0(0)	0(0)	0(7.5)	0(1.4)	0(0)	0(0)

IC205

14	13	12	11	10	9	8	7	6	5	4	3	2	1
0(0)	0(0)	1.2(0)	9(0)	9(0)	- (0)	9(0)	0(0)	9(0)	0(0)	0(0)	5.8(0)	4.4(4.2)	5.6(5.6)

Q201

B	2.7(0)
C	9.0(0)
E	2.0(0)

Q202

B	2.0(0)
C	8.3(0)
E	1.3(0)

Q203

B	1.8(0)
C	7.8(0)
E	1.1(0)

Q204

B	0(0.6)
C	0(0)
E	0(0)

Q205

B	0(0.6)
C	0(0)
E	0(0)

Q206

B	0.7(0)
C	4.5(0)
E	0(0)

Q207

B	6.0(5.2)
C	0(0)
E	5.6(5.9)

Q210

B	5.9(0)
C	9.0(0)
E	5.2(0)

Q211

B	5.9(0)
C	9.0(0)
E	5.2(0)

Q212

B	0.3
C	0
E	3.0

Q213

B	2.4
C	5.3
E	1.7

Q214

B	5.3
C	4.6
E	9.0

Q215

B	—
C	—
E	—

Q216

B	—
C	—
E	—

CN2536

1	GND
2	SPEED PLAY
3	MONITOR CUT
4	SYNC
5	SW25Hz
6	REC START IN
7	COLOUR
8	SECAM
9	4.43 MHz
10	INSERT

From
SERVO
PG506

CN2721

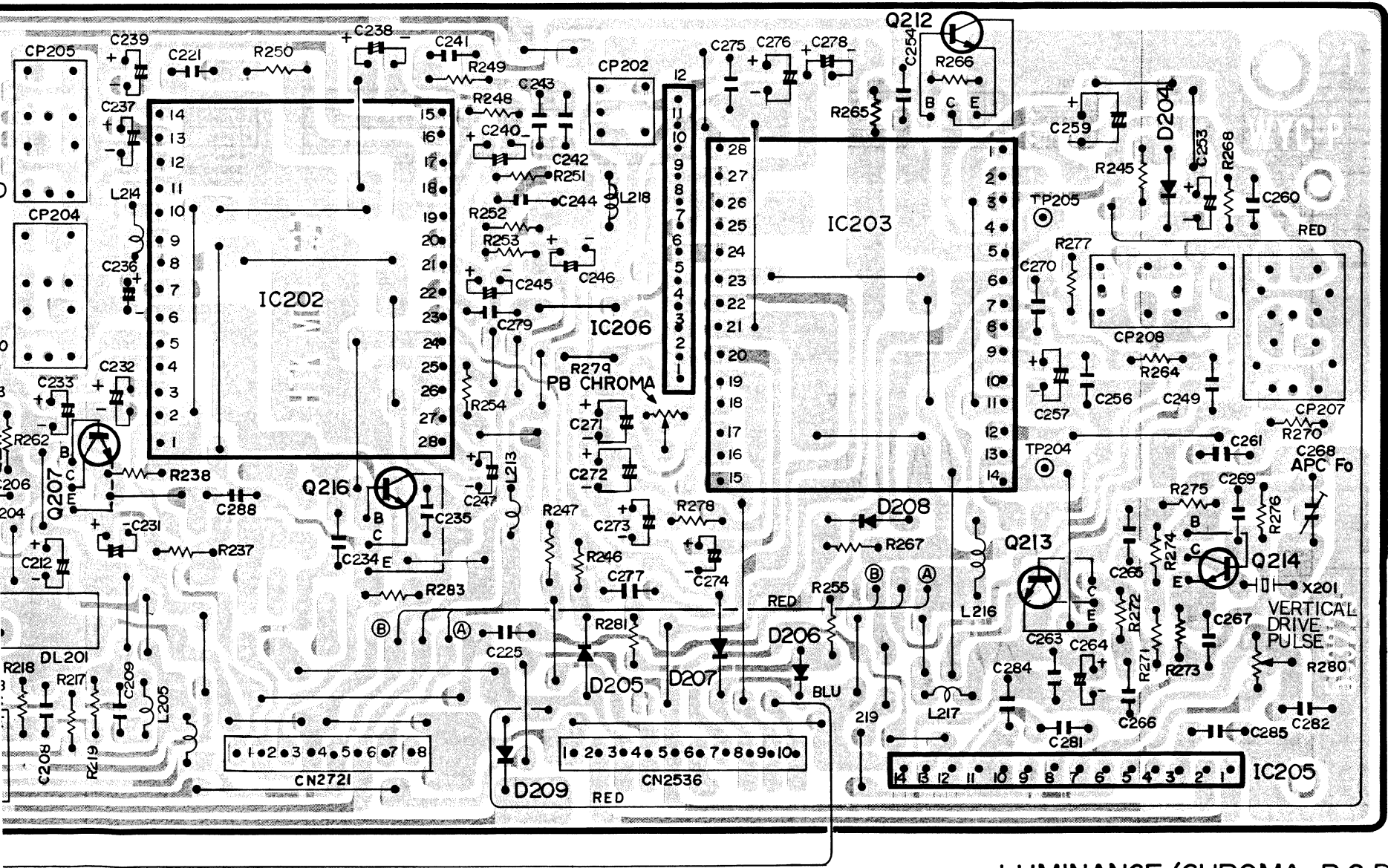
1	VIDEO
2	GND
3	VIDEO
4	GND
5	PB 9V
6	REC 9V
7	9V
8	5V

From
SERVO
PG701

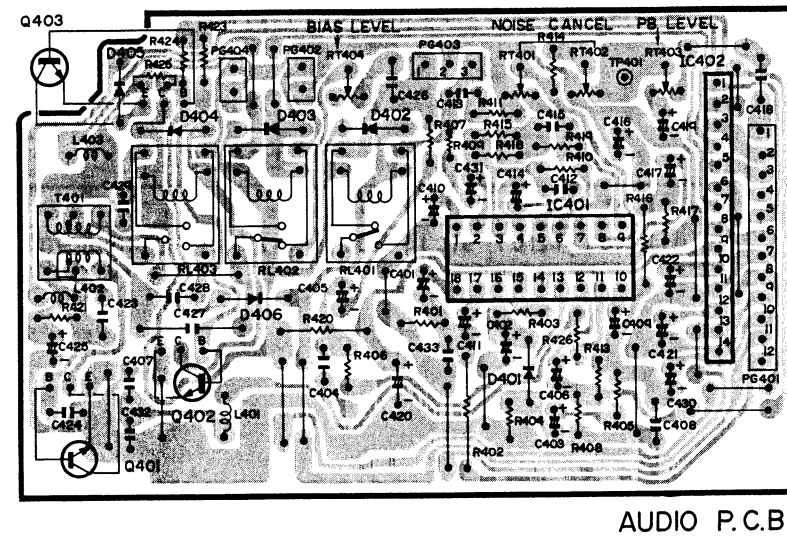
PG201

1	REC VIDEO
2	PB VIDEO
3	GND
4	GND
5	PB VIDEO
6	REC VIDEO

From
VIDEO HEAD



LUMINANCE/CHROMA P.C.B



1	0.3 (0)
2	0 (0.1)
3	5.3 (0)
4	0.3 (8.8)
5	0 (9)
6	9 (9)
7	0.2 (9)
8	8.5 (0)
9	8.7(0.26)
10	8.8 (0)
11	9.0 (0)
12	1.2 (0)
13	1.0 (9.0)
14	0 (0)

PG 401	
12	AUDIO
11	GND
10	AUDIO OUT
9	GND
8	9 V
7	PLAY
6	MUTE
5	SOUND ON SOUND
4	
3	REC 9V
2	OSC STOP
1	CYL FG

From
SERVO
PG 703

PG402	
1	FULL ERASE
2	GND

From
FULL ERASE HEAD
CN402

PG403	
3	PLAY
2	GND
1	RECORD

From
AUDIO HEAD
CN403

PG404	
1	AUDIO ERASE
2	GND

From
SOUND ON
SOUND
CN404

B (CYL)	8
+ (CYL)	7
V	6
CYL SERVO	5
ALL BIAS	4
MOTOR GND	3
CYL FG (-)	2
CYL FG (+)	1

to
SERVO
PG504

Q401

B	Q5 (0,2)
C	Q5 (8,7)
E	O (0,4)

Q402

B	Q3 (0)
C	q (q)
E	O (0)

Q403

B	Q1 (0)
C	Q0 (Q,0)
E	Q1 (0,2)

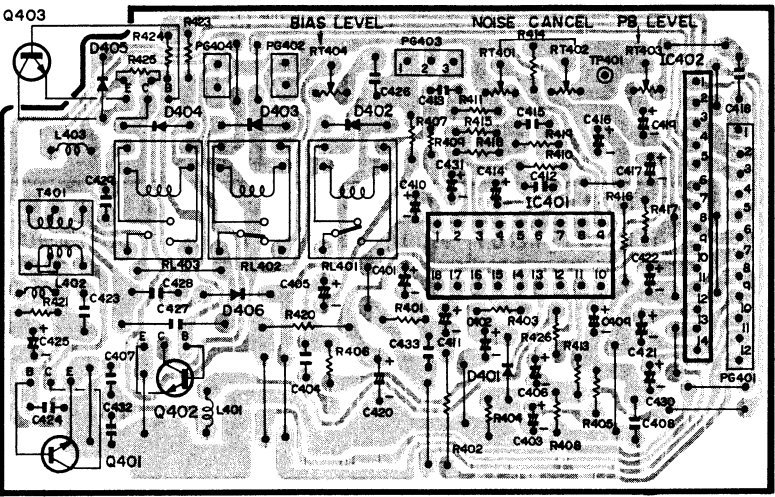
1	2	3	4	5	6	7	8	9
1.3 (1.2)	0.6 (0.6)	0 (0)	3.6 (3.6)	0 (0)	8.7 (8.7)	0.970 (96)	0 (0)	0 (0)
18	17	16	15	14	13	12	11	10
0.63(0, 7)	0 (0)	0 (0)	8.7 (8.8)	8.7(0,26)	2.6(0,3)	0.3 (1.44)	0 (0.8)	4.3 (4.3)

A periodic waveform is shown with a period of $12.5\mu\text{s}$ and a peak-to-peak voltage of 64Vp-p .

Timing diagram for the output of the 7414 Schmitt trigger. The waveform is a square wave with a period of 3 msec and a peak-to-peak voltage of 0.2 Vp-p.

10msec 0.6Vp-p

CYLINDER MOTOR DRIVER



AUDIO P.C.B

Q401		
B	Q5 (0.2)	
C	Q5 (8.7)	
E	Q (0.4)	

Q402		
B	Q3 (0)	
C	q (4)	
E	Q (0)	

Q403		
B	Q1 (0)	
C	Q0 (0.0)	
E	Q1 (0.2)	

IC 401								
1	2	3	4	5	6	7	8	9
1.3 (1.2)	0.6 (0.6)	0 (0)	3.6 (3.6)	0 (0)	8.7 (8.7)	0.97 (0.96)	0 (0)	0 (0)
18	17	16	15	14	13	12	11	10
0.63 (0.7)	0 (0)	0 (0)	8.7 (8.8)	8.7 (0.26)	2.6 (0.3)	0.3 (1.44)	0 (0.8)	4.3 (4.3)

PG 401	
12	AUDIO
11	GND
10	AUDIO OUT
9	GND
8	q v
7	PLAY
6	MUTE
5	SOUND ON SOUND
4	
3	REC qv
2	OSC STOP
1	CYL FG

From
SERVO
PG 703

PG402	
1	FULL ERASE
2	GND

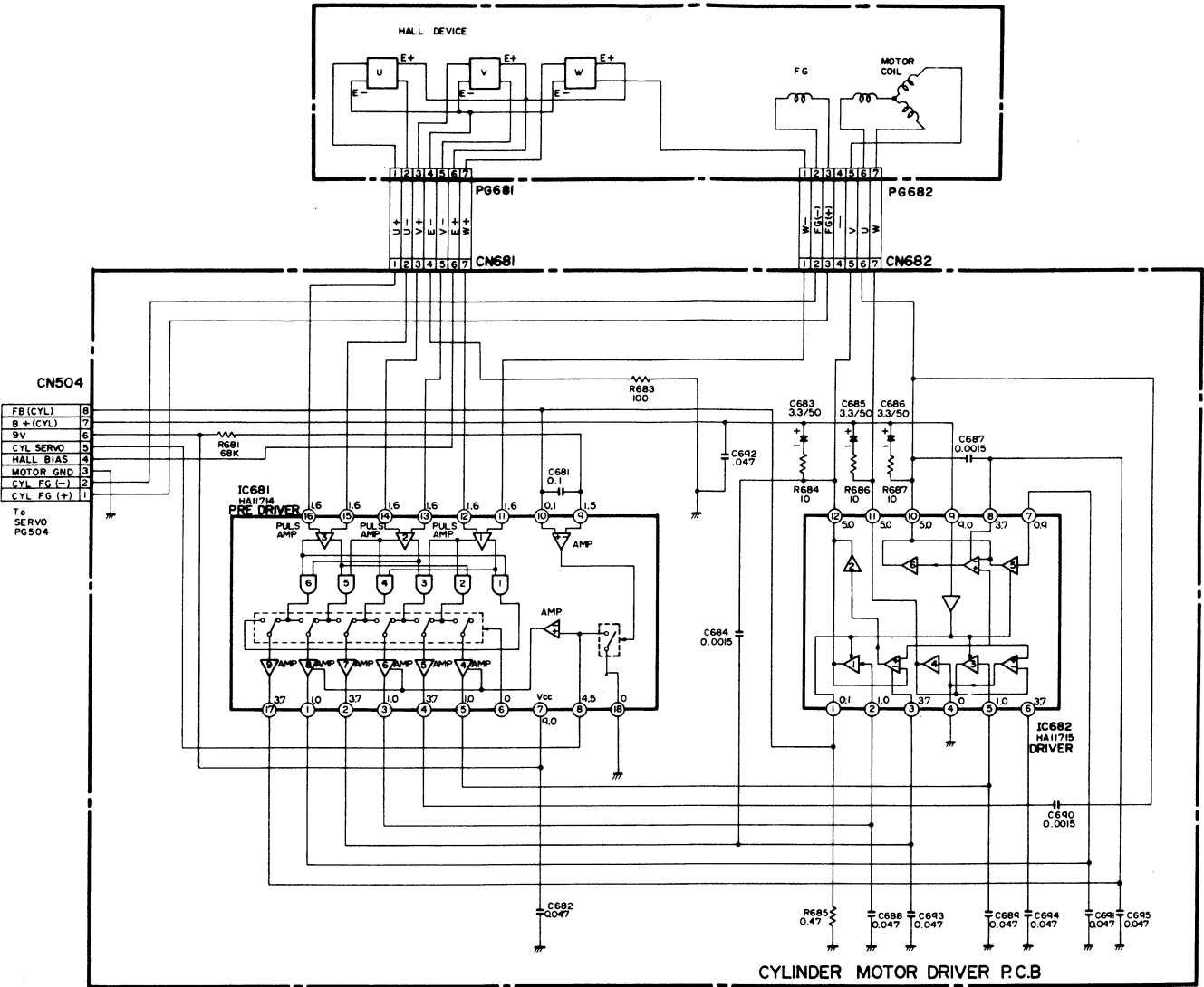
From
FULL ERASE HEAD
CN402

PG403	
3	PLAY
2	GND
1	RECORD

From
AUDIO HEAD
CN403

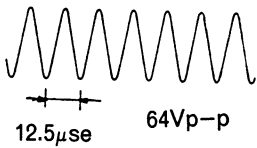
PG404	
1	AUDIO ERASE
2	GND

From
SOUND ON
SOUND
CN404

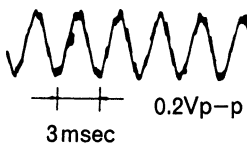


CYLINDER MOTOR DRIVER P.C.B

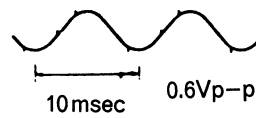
PG403-1 REC



PG401 PB(3kHz)



TP401 PB



CN681

1	U+
2	U-
3	V+
4	E-
5	V-
6	E+
7	W

To
CYLINDER
MOTOR
PG681

CN682

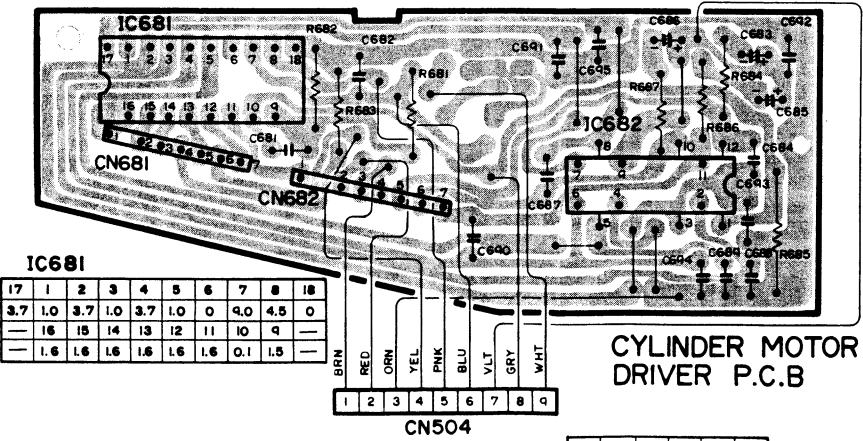
1	W+
2	FG (-)
3	FG (+)
4	
5	V
6	U
7	W

To
CYLINDER
MOTOR
PG682

CN504

1	CYL FG (+)
2	CYL FG (-)
3	MOTOR GND
4	HALL BIAS
5	CYL SERVO
6	qV
7	B+ (CYL)
8	FB (CYL)

To
SERVO
PG504



CYLINDER MOTOR DRIVER P.C.B

IC681	
17	1
3.7	1.0
16	15
1.6	1.6

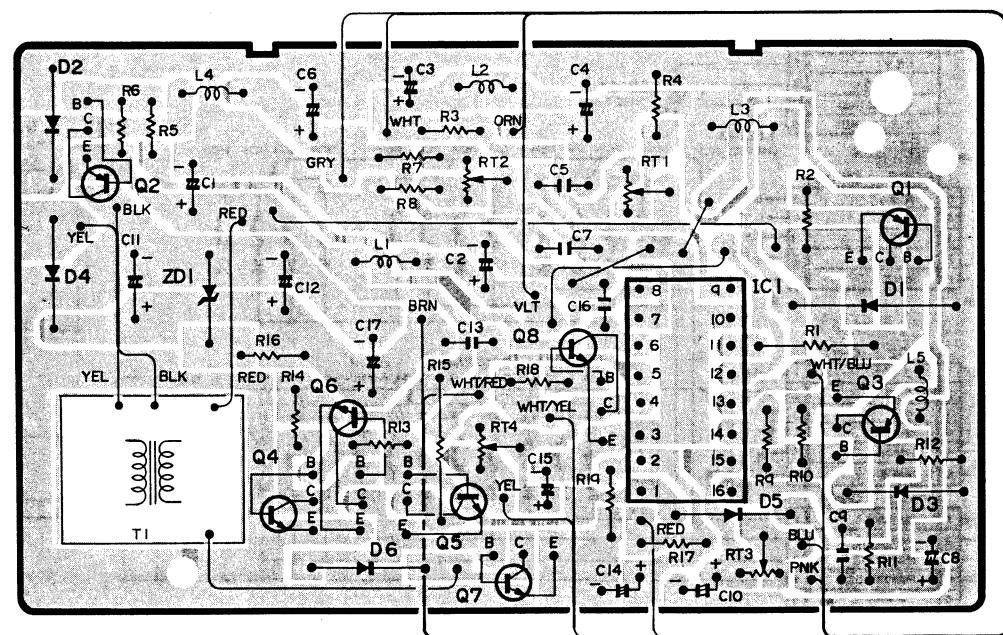
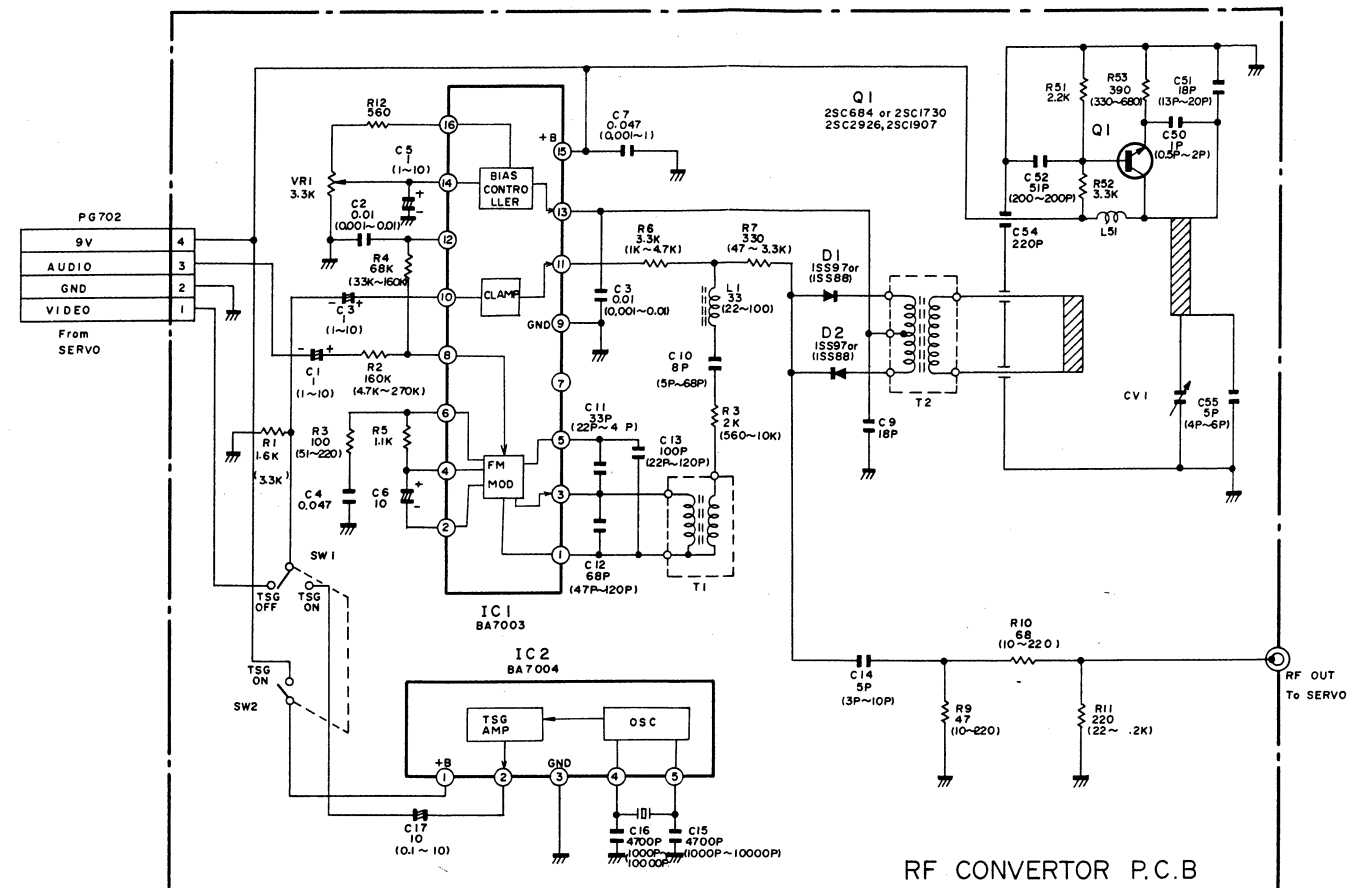
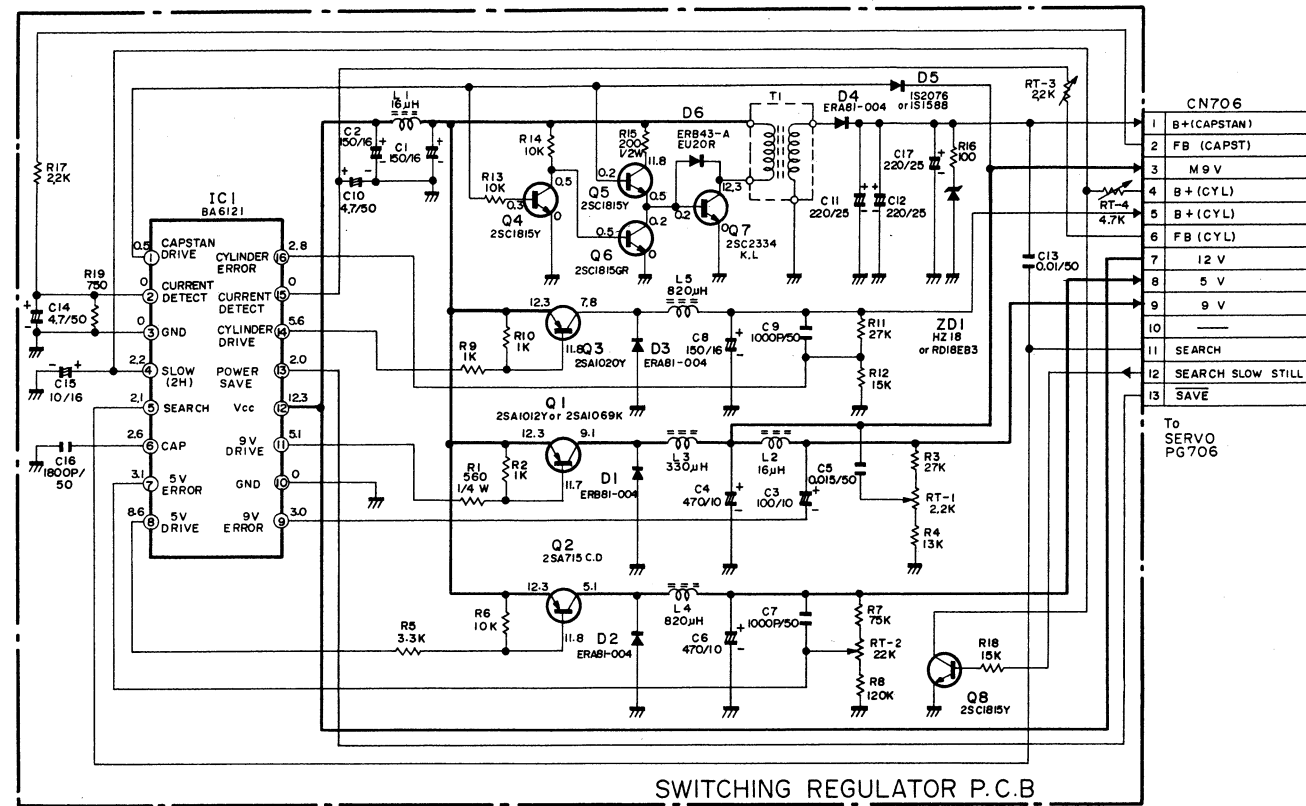
CN504	
1	2
3	4
5	6
7	8
9	10
11	12
13	14
15	16
17	18

IC 682

IC 682	
7	8
9.9	3.7
6	5
3.7	1.0

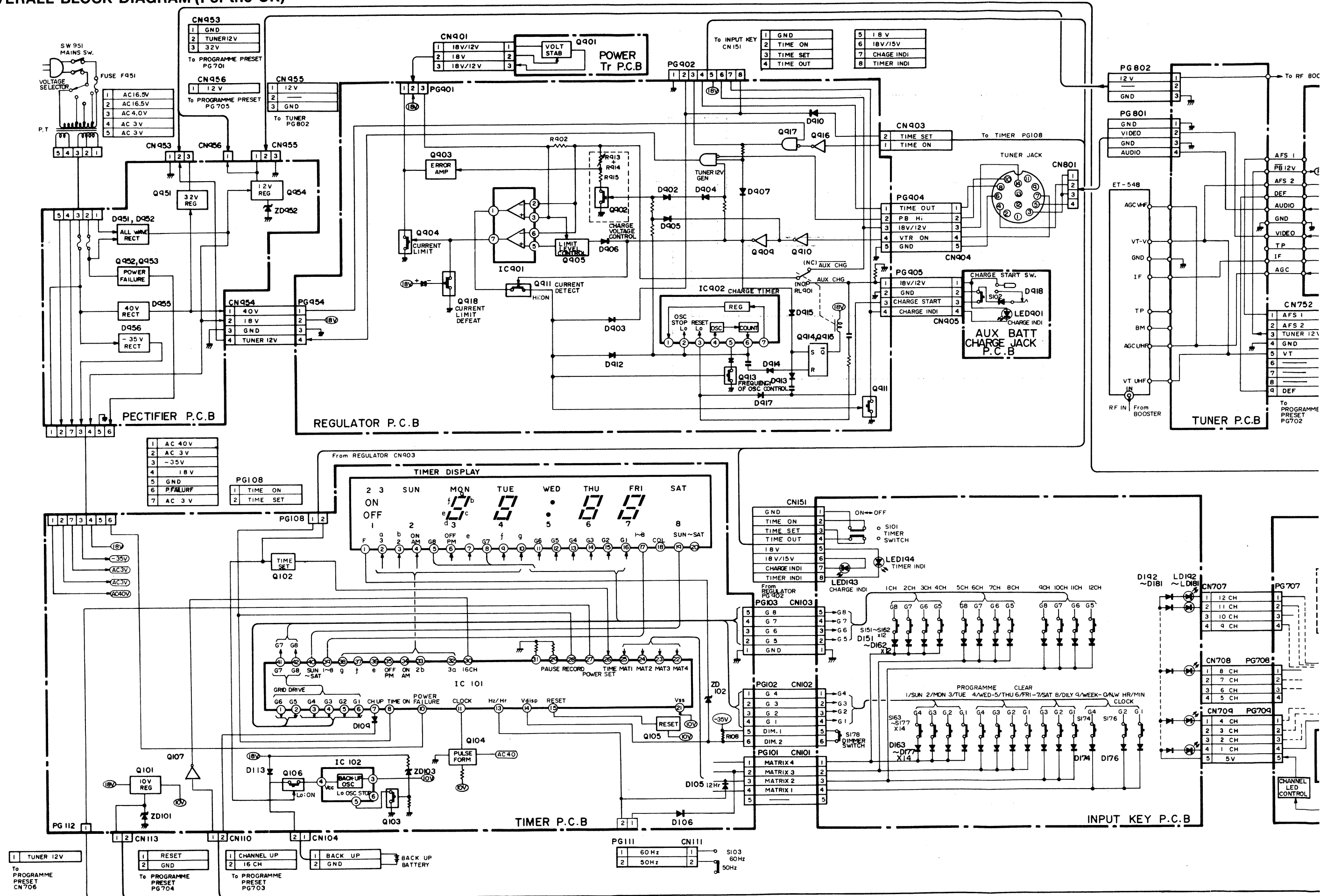
SWITCHING REGULATOR

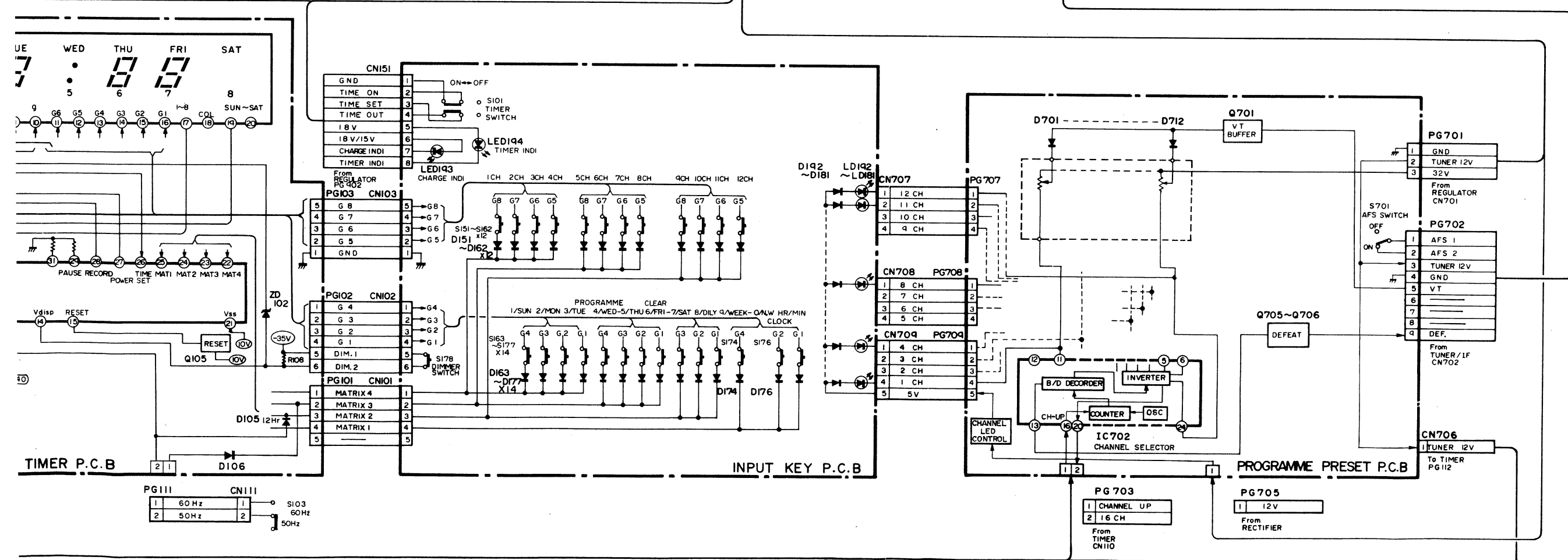
RF CONVERTER



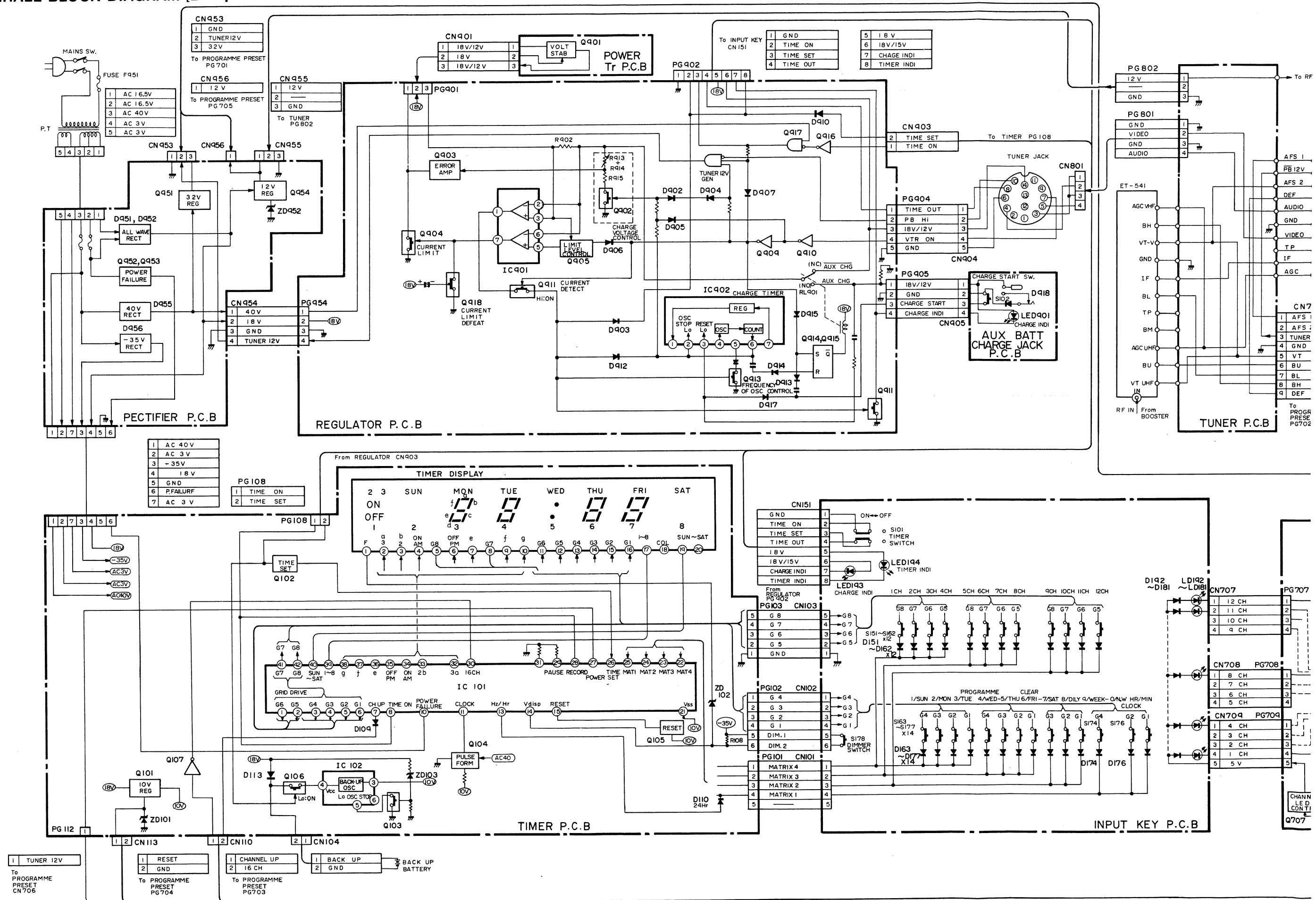
CN706	
BRN	1 B+ (CAPSTAN)
RED	2 FB (CAPST)
ORN	3 9 V
YEL	4 B+ (CYL)
PNK	5 B+ (CYL)
BLU	6 FB (CYL)
VLT	7 12 V
GRY	8 5 V
WHT	9 9 V
10	
WHT/RED	11 SEARCH
WHT/YEL	12 SEARCH SLOW
WHT/BLU	13 SAVE
To SERVO PG706	

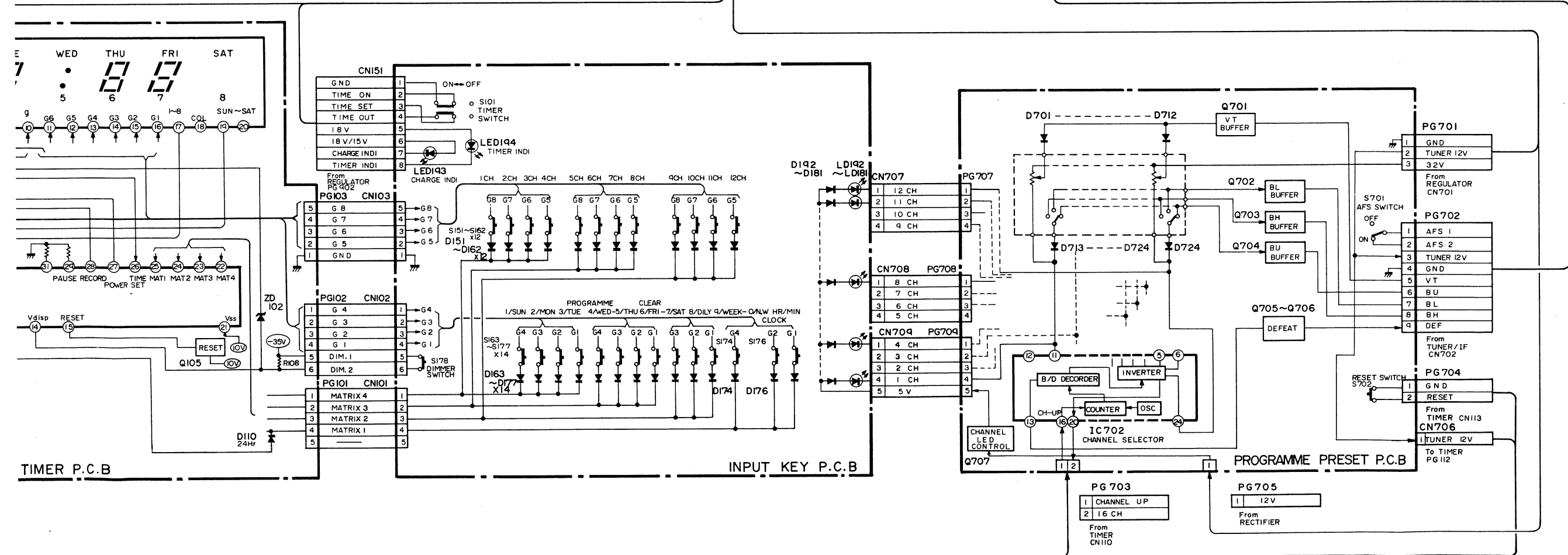
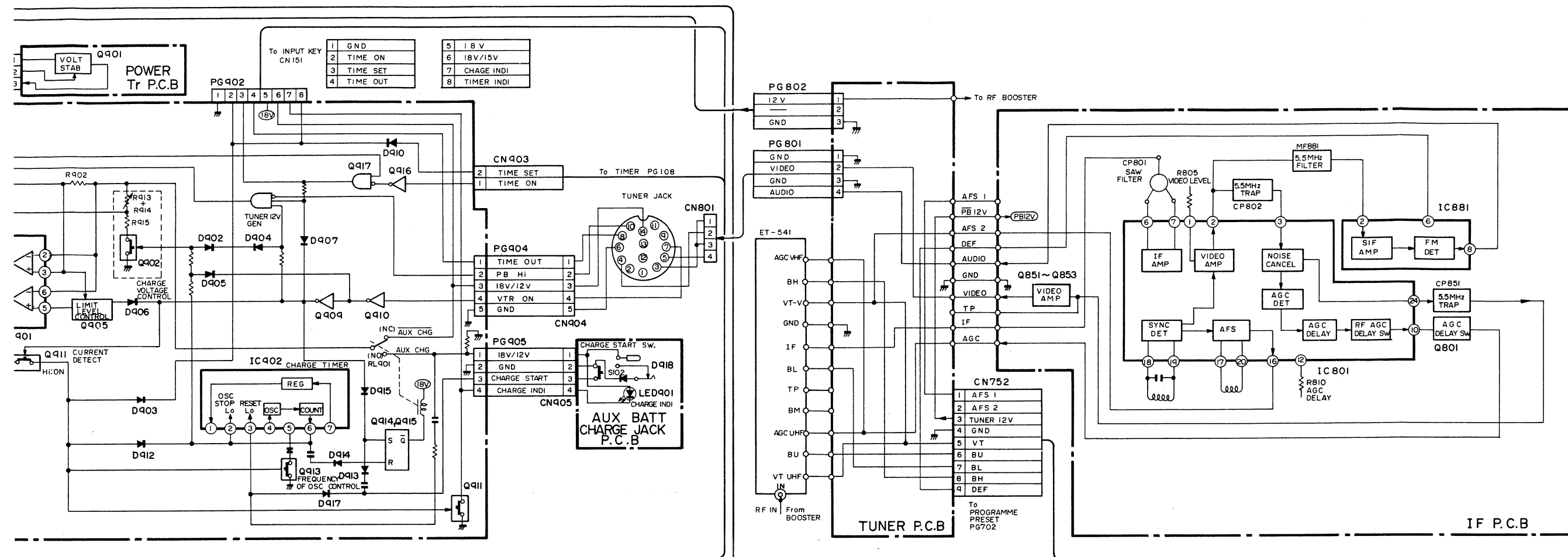
VT-TU65E OVERALL BLOCK DIAGRAM (For the UK)



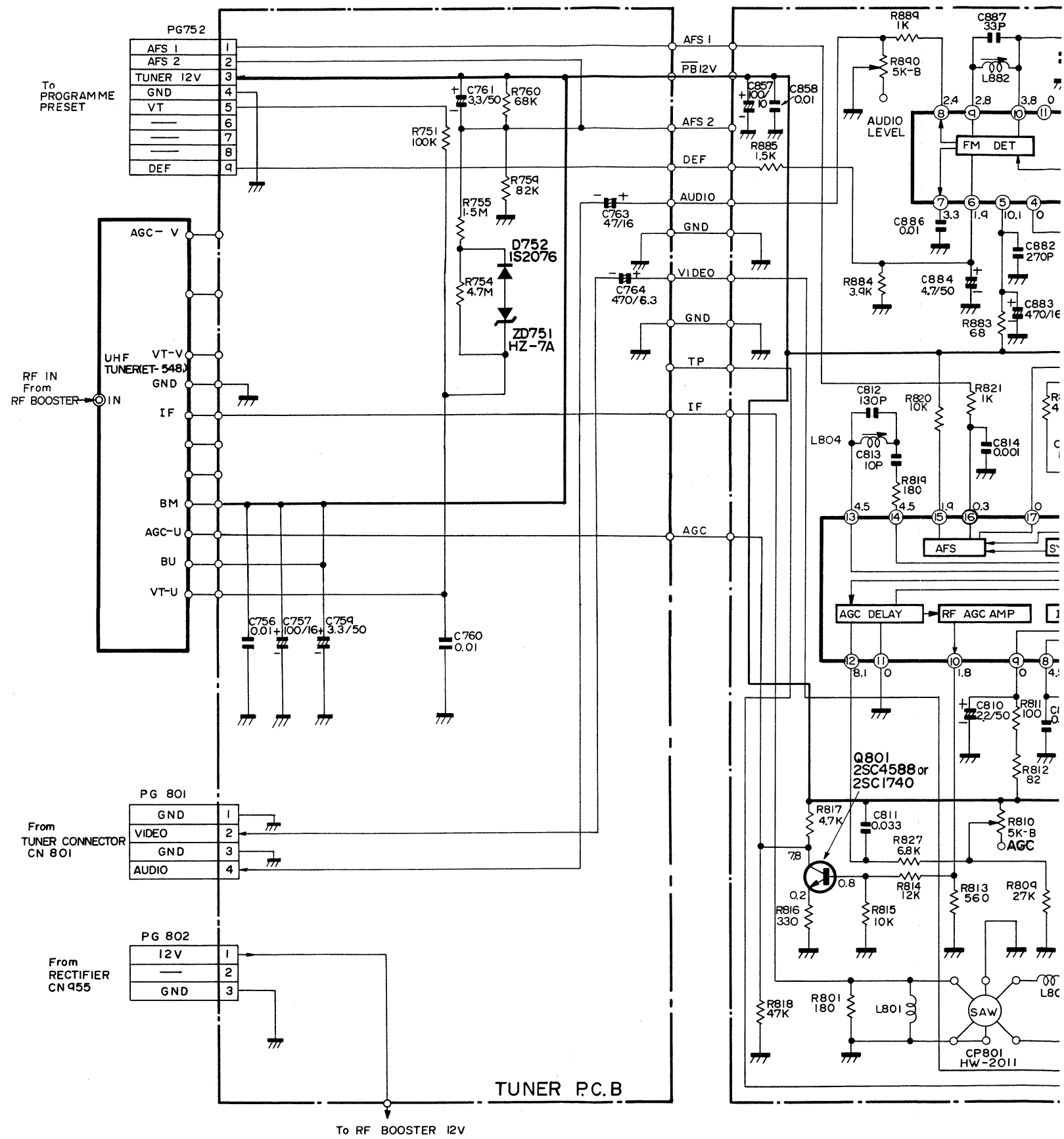
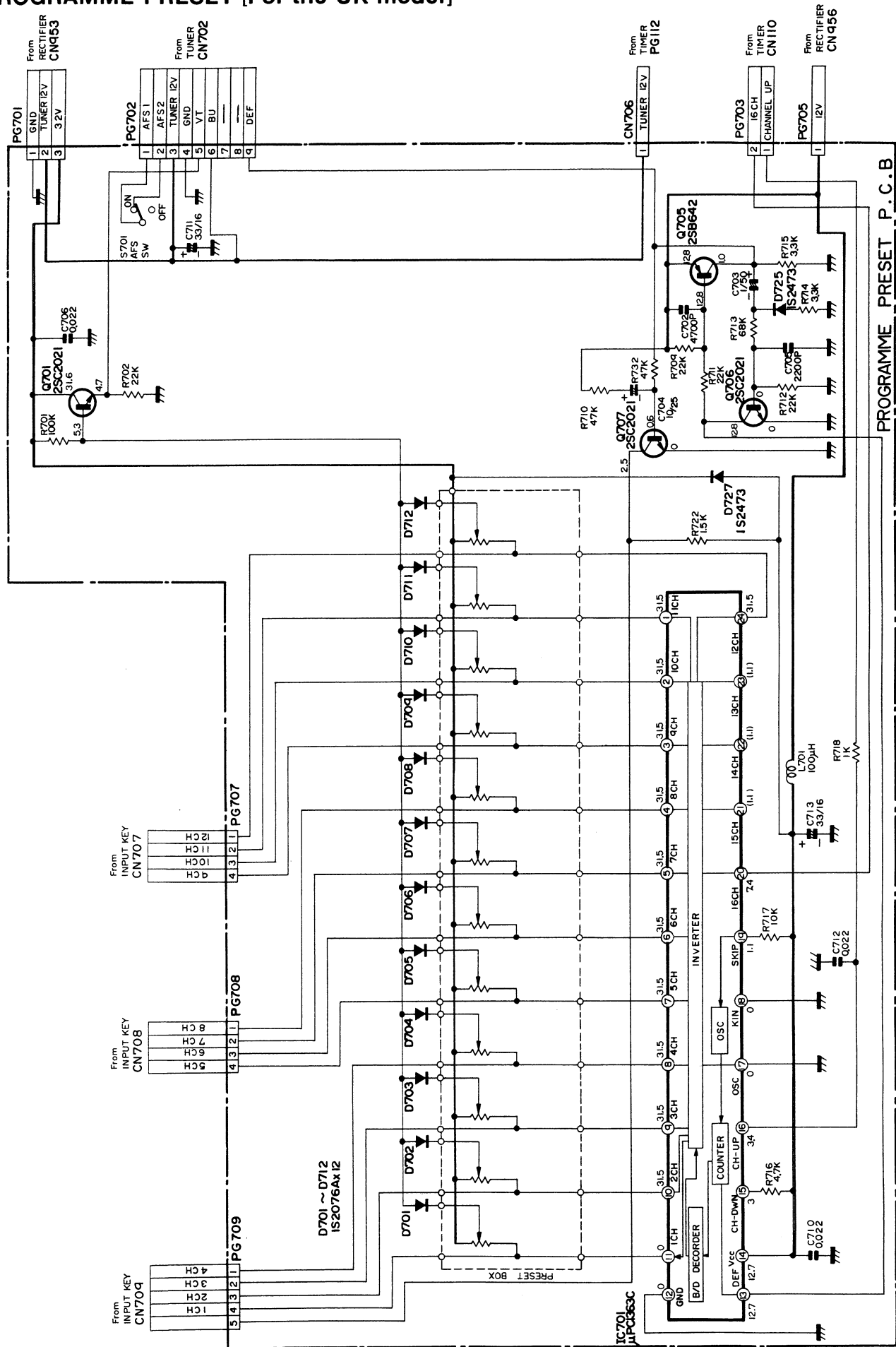


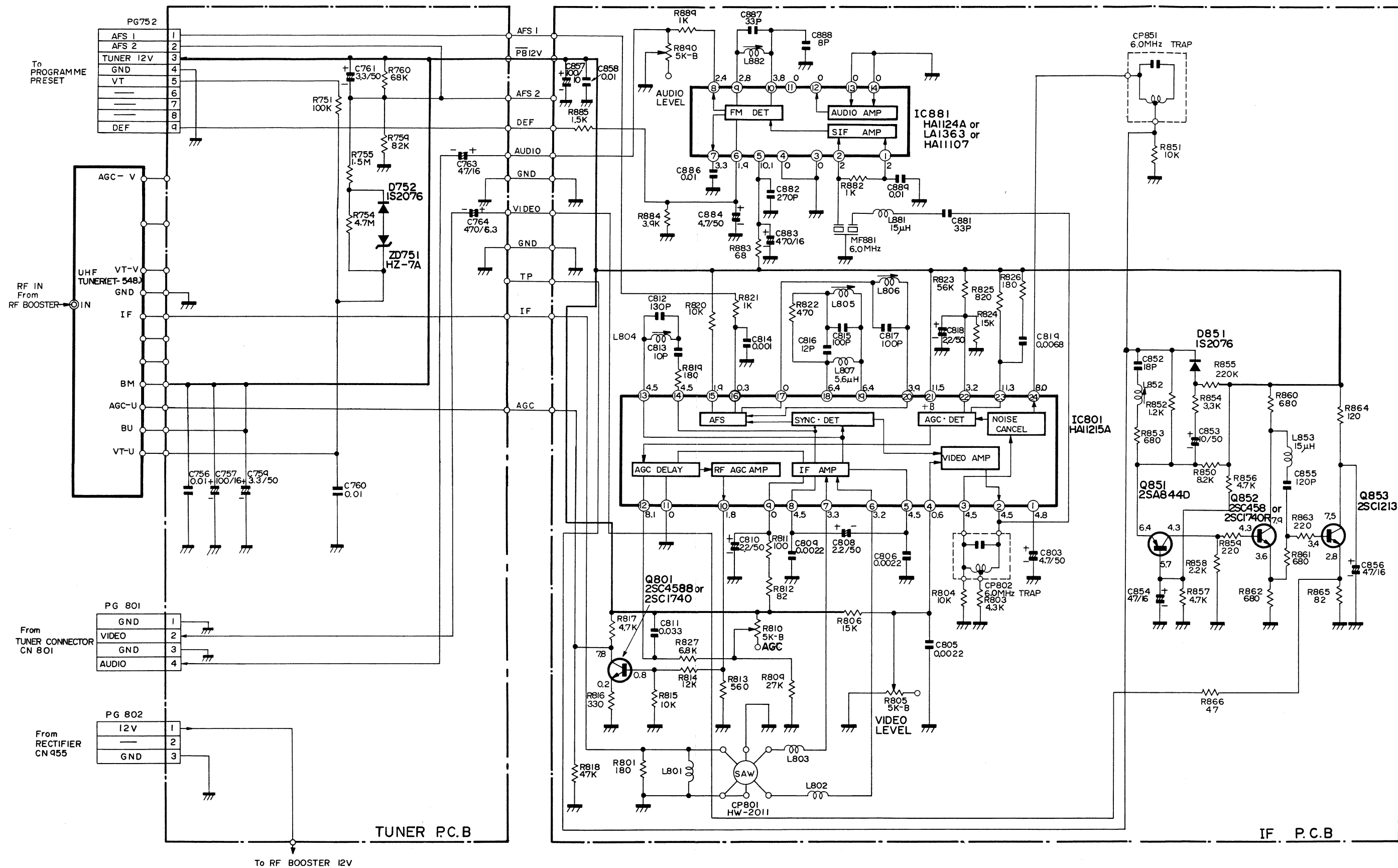
VT-TU65E OVERALL BLOCK DIAGRAM [Except for the UK model]



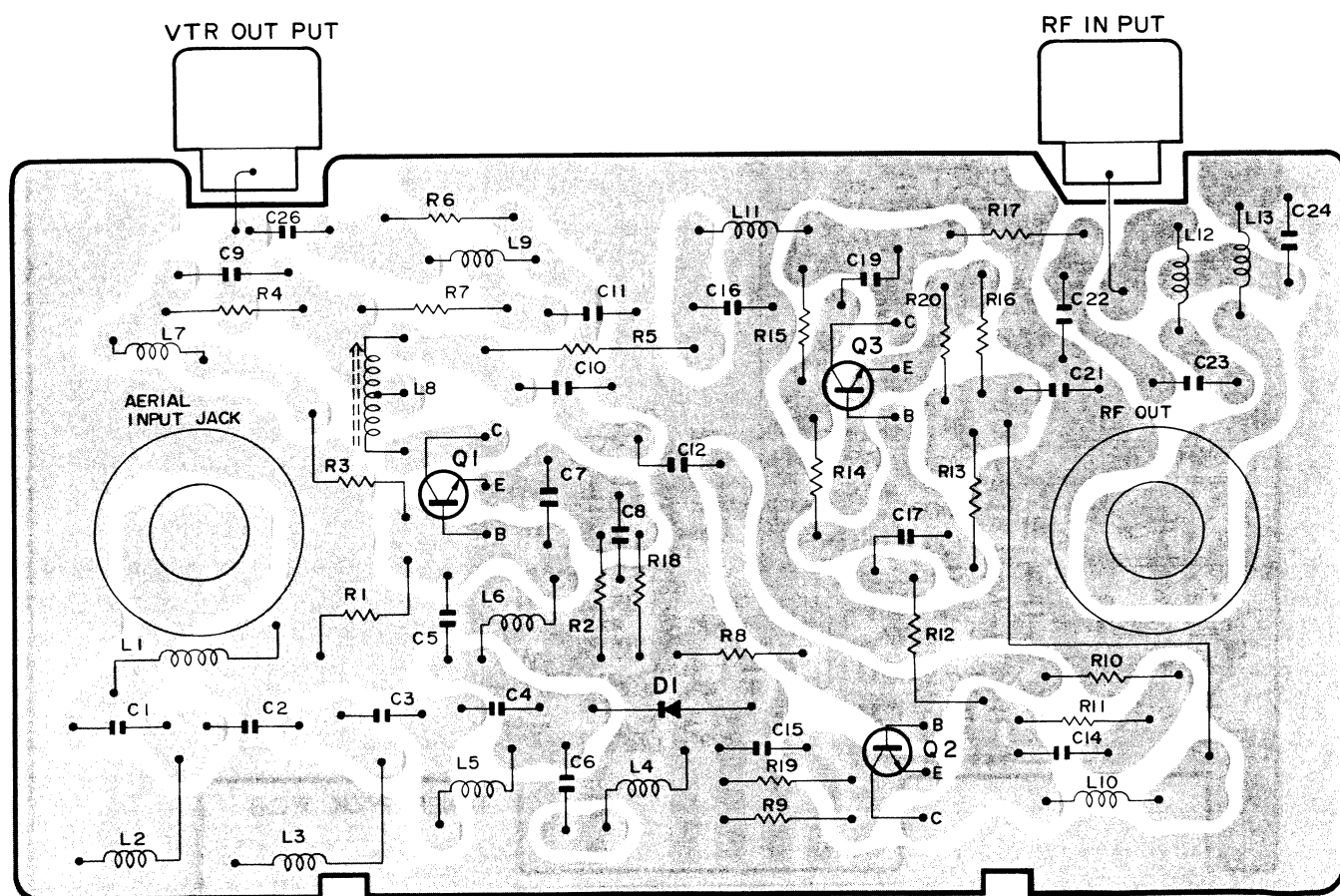
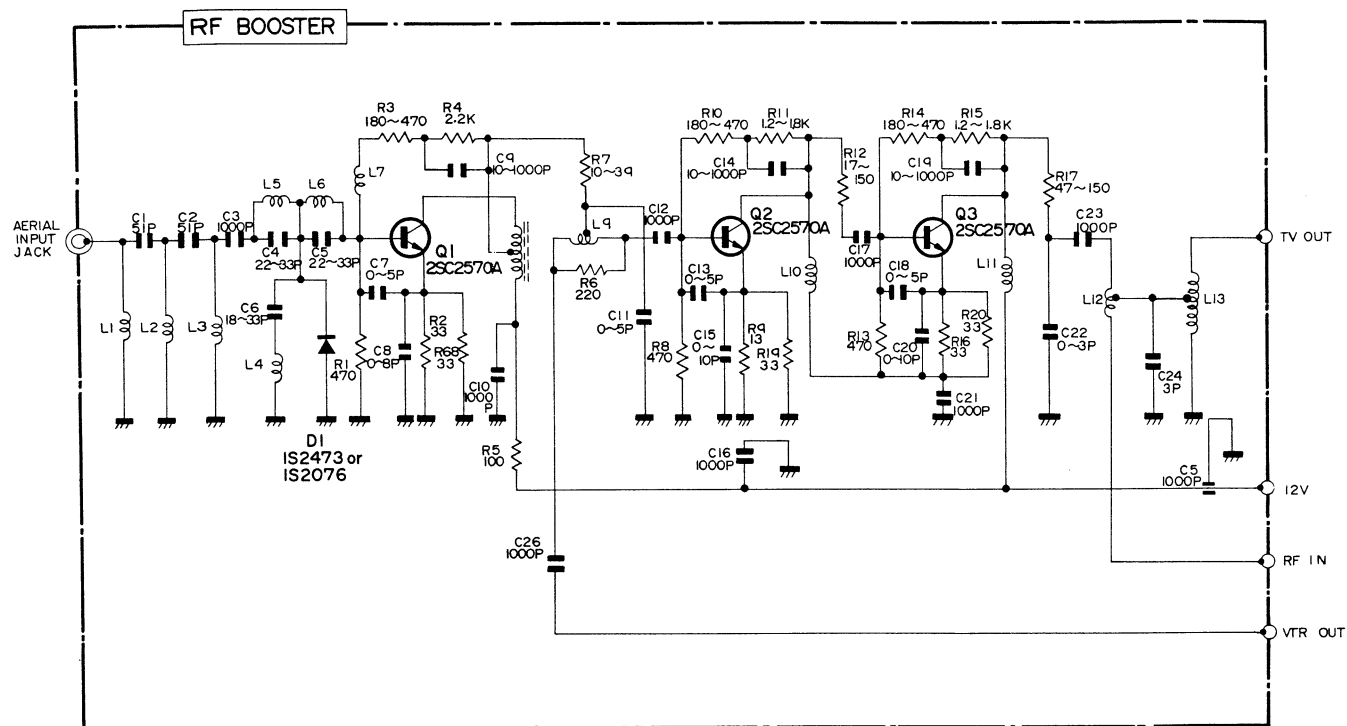


PROGRAMME PRESET [For the UK model]





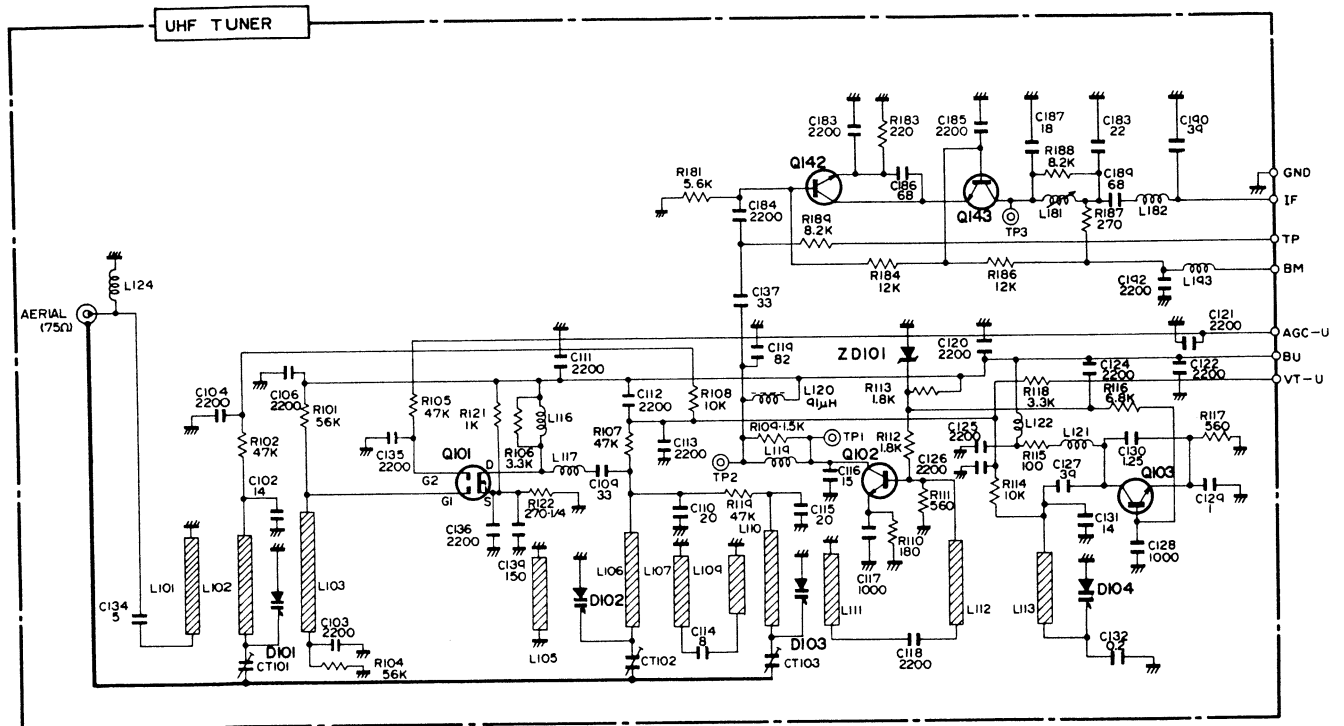
RF BOOSTER



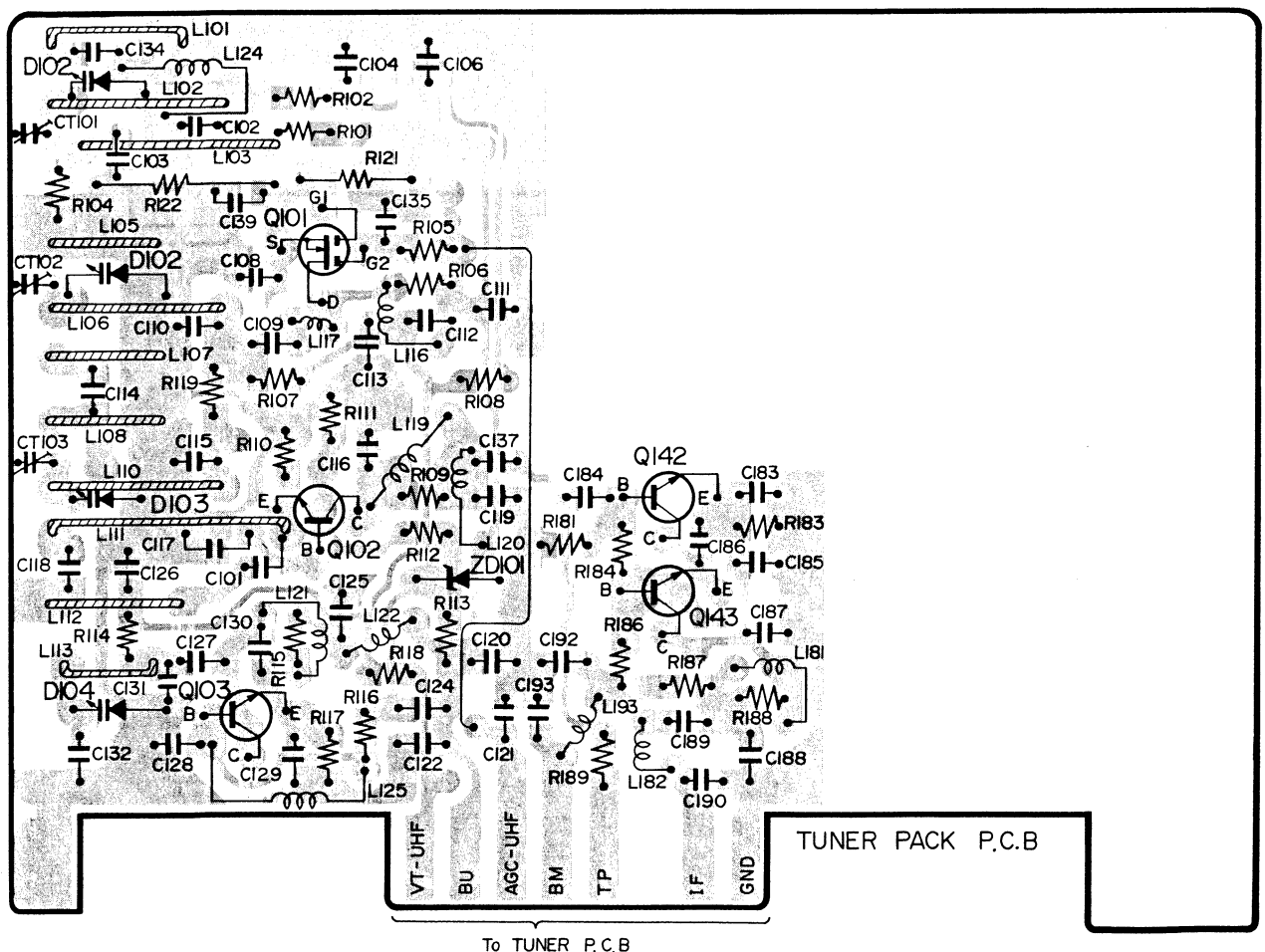
TUNER/IF [For the UK model]

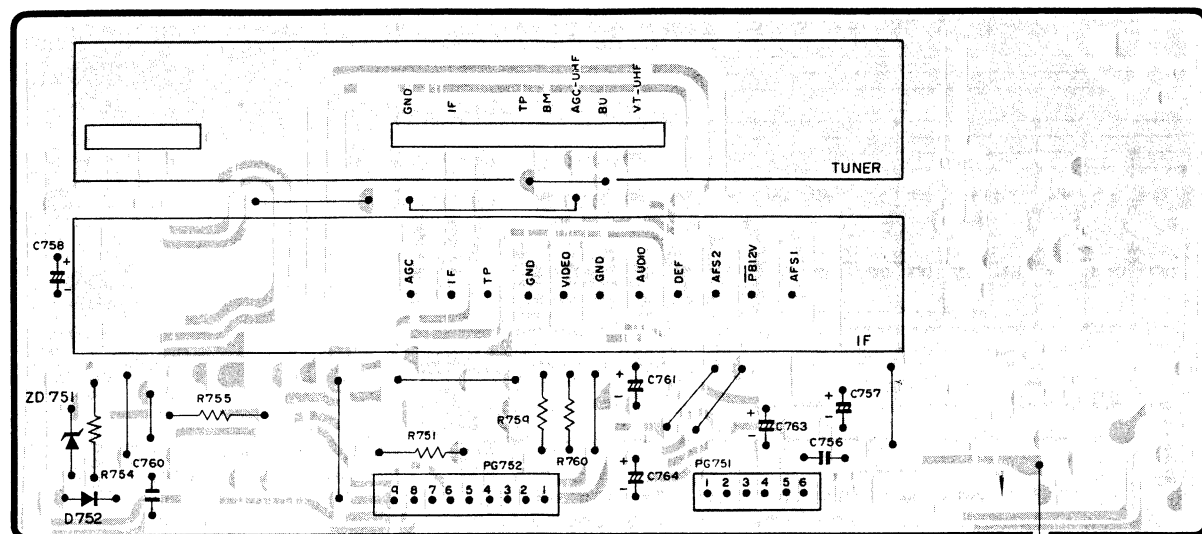
ET-548

Q101 3SK83Y/3SK82Y Q102 2SC2353B/2SC2466Y Q103 2SC2468Y Q142 2SC2469Y Q143 2SC2469Y



D101 ISV 70 D102 ISV 70 D103 ISV 70 D104 ISV 70 ZD101 HZ4C/HZ5A





PG752	
1	AFS 1
2	AFS 2
3	PB 12V
4	GND
5	VT
6	
7	
8	
9	DEF

From PROGRAM PRESET
PG 732

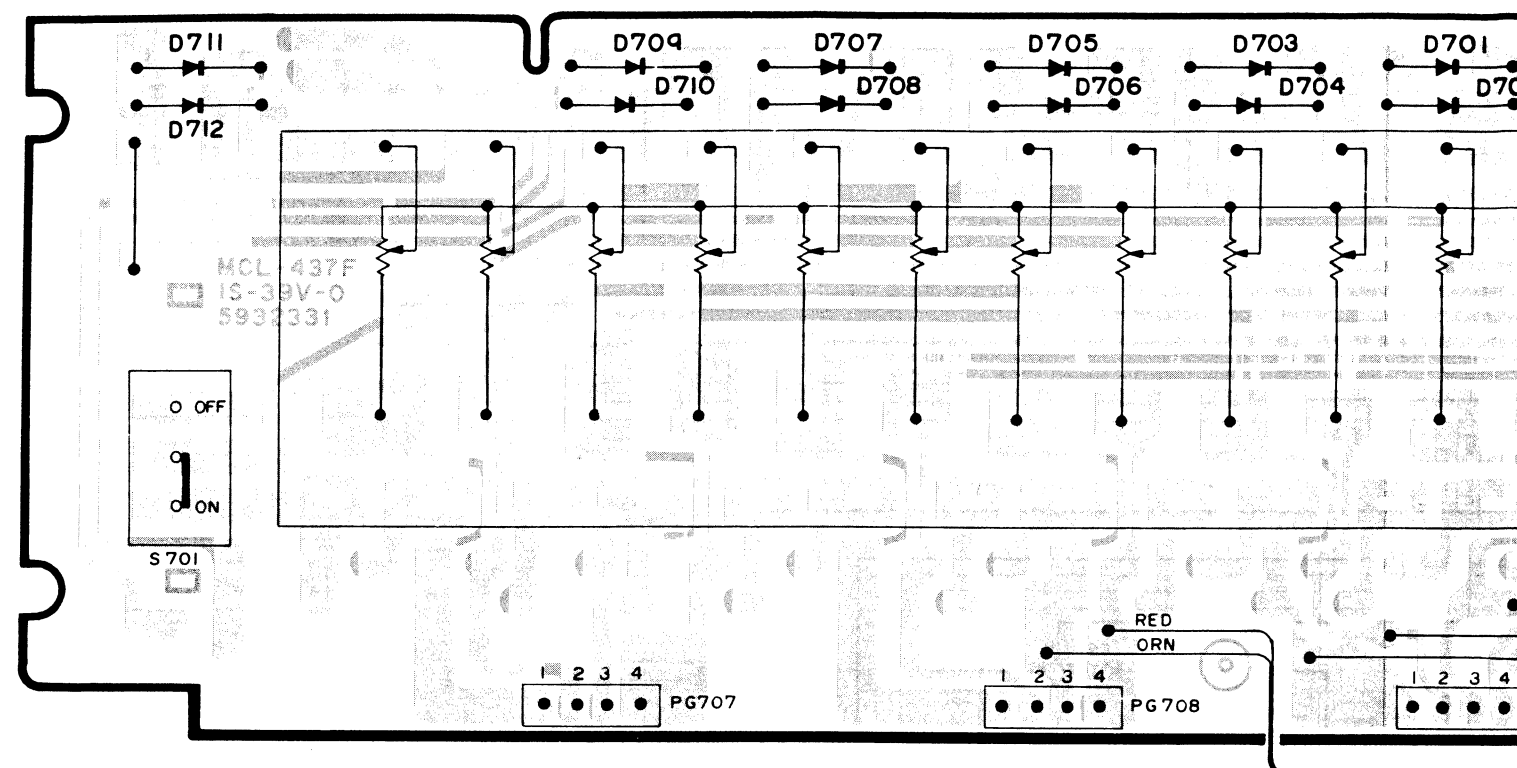
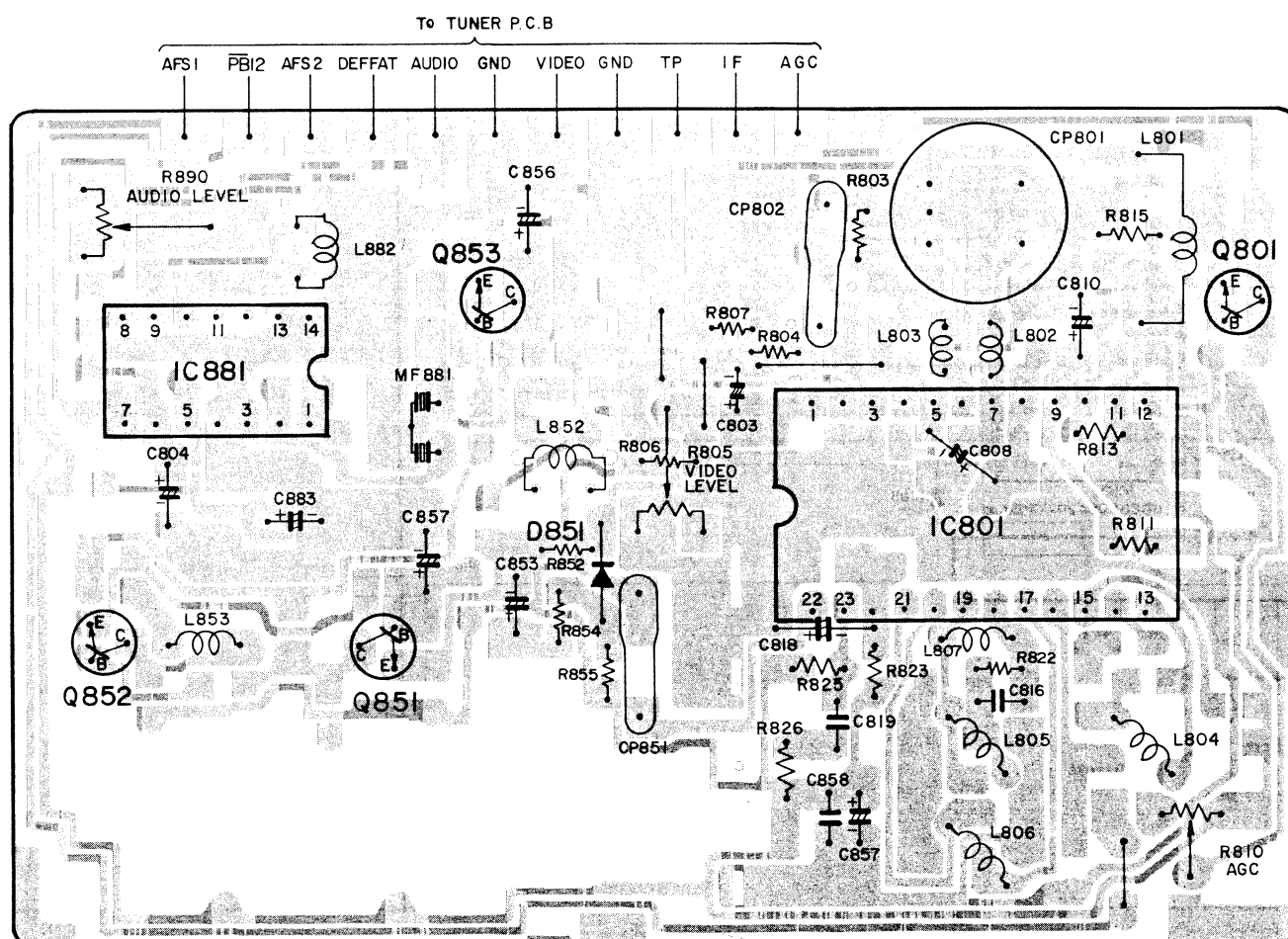
PG751	
1	GND
2	VIDEO OUT
3	GND
4	AUDIO OUT

From
TUNER
CONNECTOR

PG802	
1	12V
2	
3	GND

From
RECTIFIER
CN955

To BOOSTER



PG707

1	12 CH
2	11 CH
3	10 CH
4	9 CH

From
INPUT KEY
CN707
PG 701

1	GND
2	TUNER 12V
3	32V

From
RECTIFIER
CN956

PG708

1	8CH
2	7CH
3	6CH
4	5CH

From
INPUT KEY
CN708
PG 702

1	AFS 1
2	AFS 2
3	TUNER 12V
4	GND
5	VT
6	BU
7	
8	
9	DEFEAT

From
TUNER/IF
CN702

PG 709

1	4CH
2	3CH
3	2CH
4	1CH
5	5V

From
INPUT KEY
CN709

PG 703

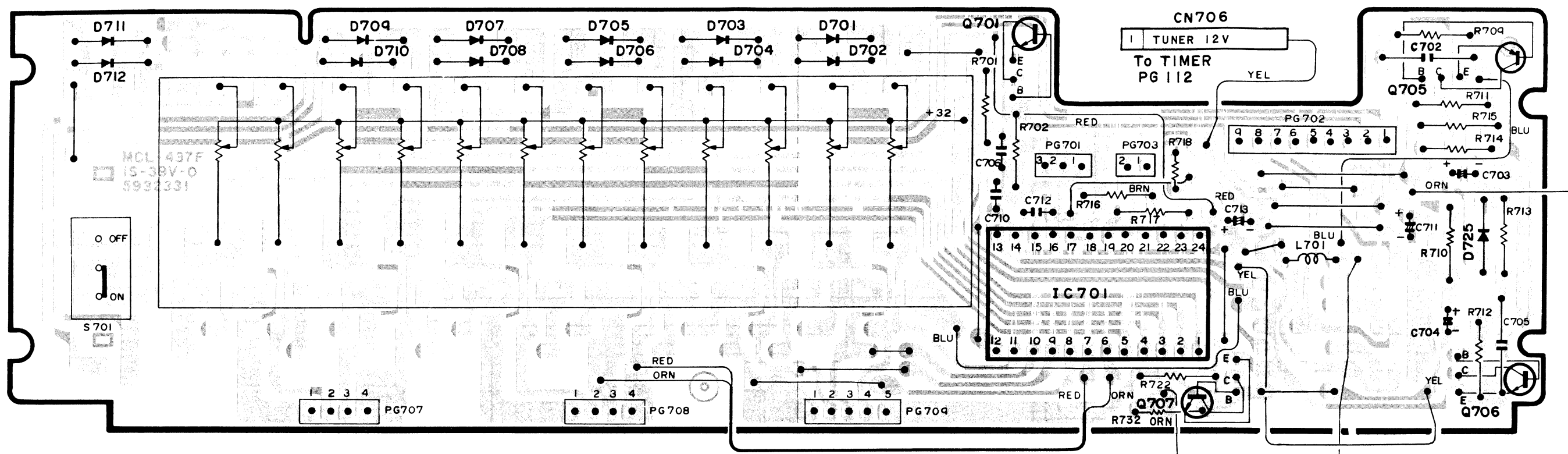
1	16 CH
2	CHANNEL

From
TIMER
CN110

Q701

B	5.3
C	31.6
E	4.7

PROGRAMME PRESET



PG707

1	12 CH
2	11 CH
3	10 CH
4	9 CH

From
INPUT KEY
CN707
PG701

1	GHD
2	TUNER 12V
3	32V

From
RECTIFIER
CN956

PG708

1	8CH
2	7CH
3	6CH
4	5CH

From
INPUT KEY
CN708
PG702

1	AFS 1
2	AFS 2
3	TUNER 12V
4	GND
5	VT
6	BU
7	
8	
9	DEFEAT

From
TUNER/IF
CN702

PG709

1	4CH
2	3CH
3	2CH
4	1CH
5	5V

From
INPUT KEY
CN709

PG703

1	16 CH
2	CHANNEL

From
TIMER
CN110

PROGRAMME PRESET P.C.B

PG705

1	12V
---	-----

To
RECTIFIER
CN956

IC701

13	14	15	16	17	18	19	20	21	22	23	24
12.7	12.7	3.0	3.4	0	0	1.1	7.4	(1.1)	(1.1)	(1.1)	31.5
12	11	10	9	8	7	6	5	4	3	2	1
0	0	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5

Q701

B	5.3
C	31.6
E	4.7

Q705

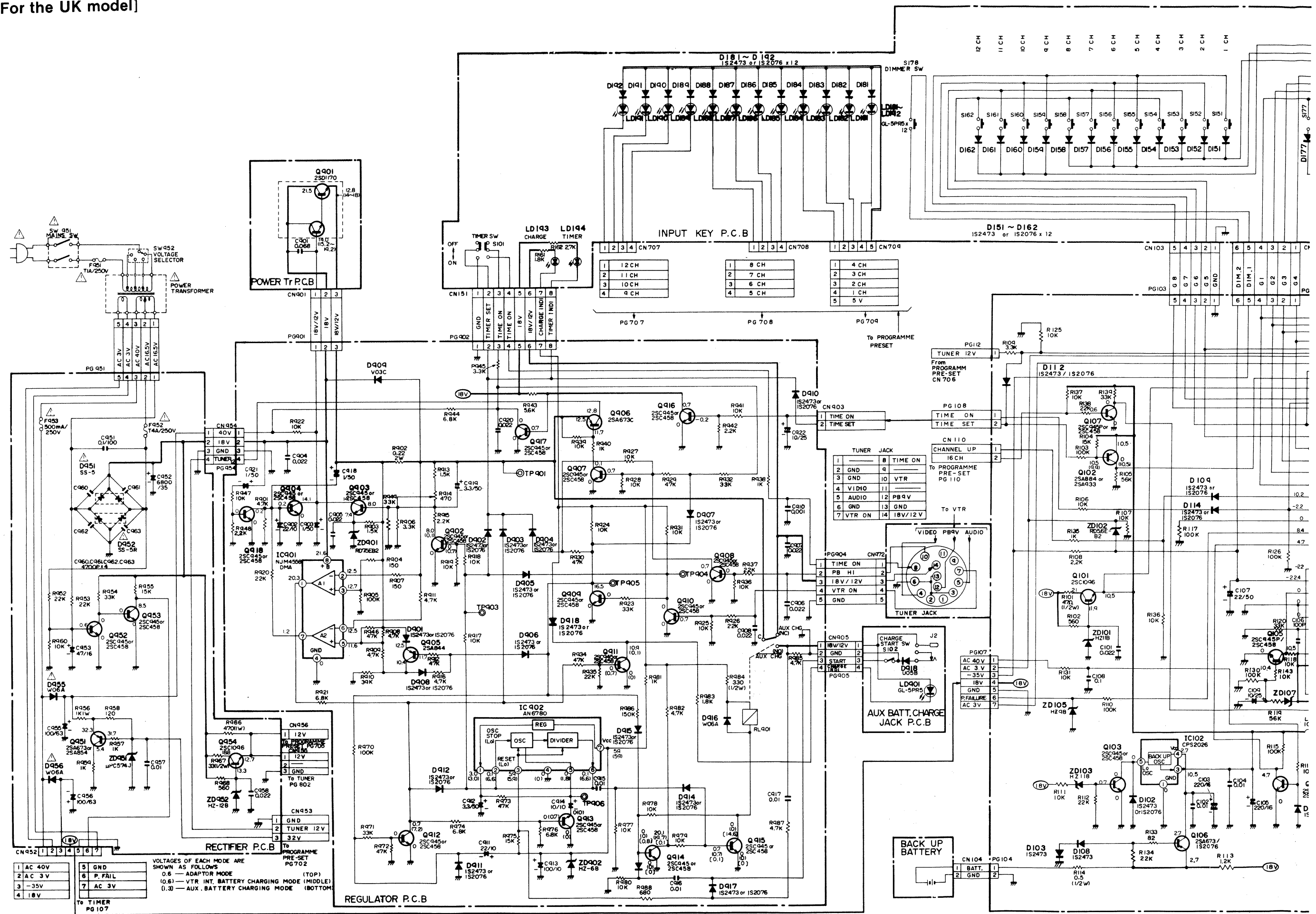
B	12.8
C	1.0
E	12.8

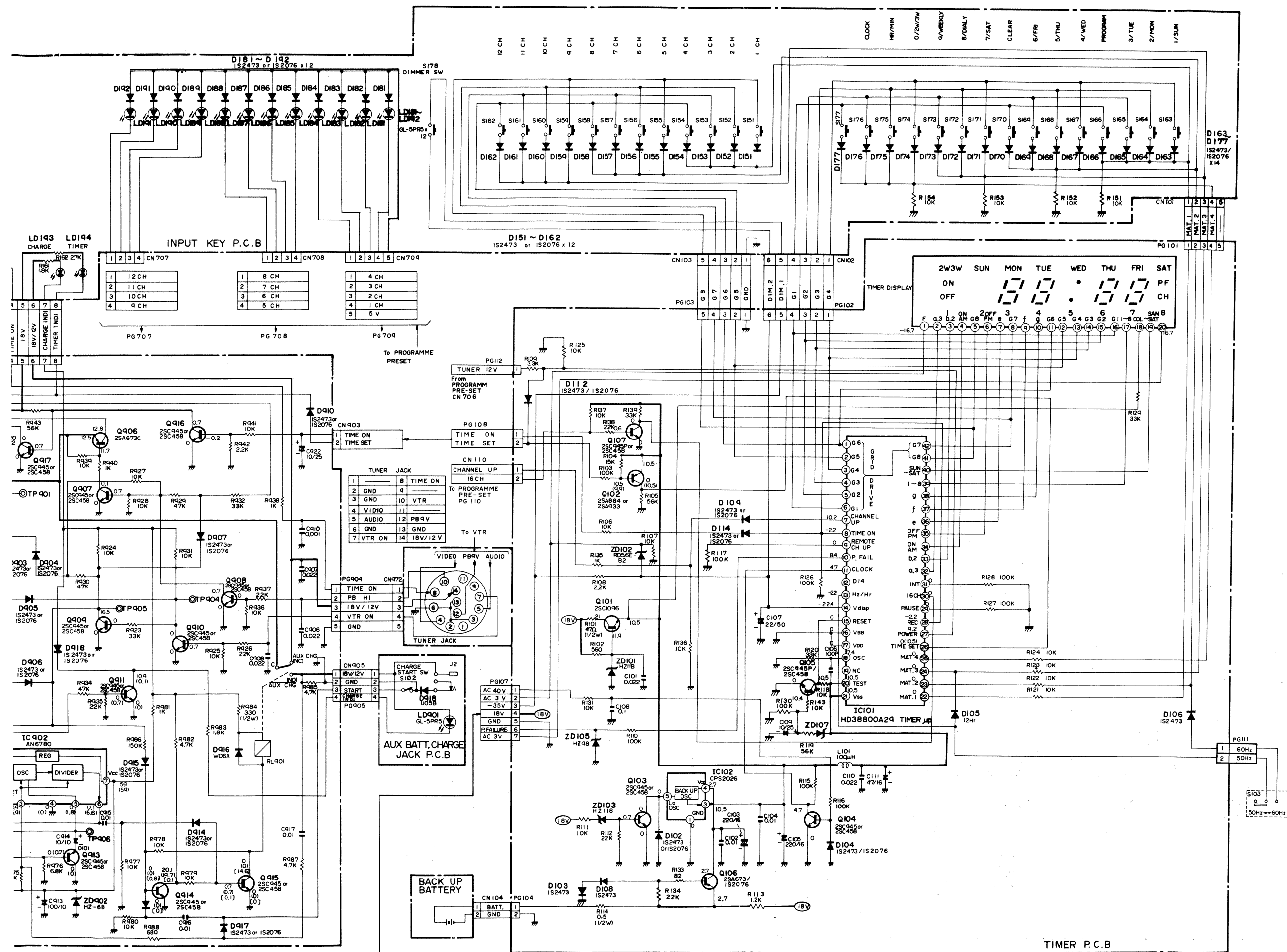
Q706

B	0
C	12.8
E	0

Q707

B	0.6
C	2.5
E	0





PIN	I/O	ACTIVE LEVEL	ABBREVIATION	FUNCTION
41 42 1 2 3 4 5 6	O	Hi	G ₈ G ₇ G ₆ G ₅ G ₄ G ₃ G ₂ G ₁	G ₅ — G ₈ : Channel selection matrix pulse forming and display grid driving pulse. G ₁ — G ₄ : Keyboard selection matrix pulse forming and display grid driving pulse. (Fig. A)
7	O	Lo → Hi	CHANNEL UP	This is a rectangular pulse with a width of 100 msec. When the 16CH pulse (30) is detected, this pin generates the same number of pulses as the tuned channels to perform channel selection.
8	O	Hi	TIME ON	Set to Hi, and Hi during recording. 1. Precedence of executing programs is as shown below. Those with earlier set time > Those with smaller program No. 2. Program to be executed when the power is restored. Program which has started before power failure.
9	O	Hi	REMOTE CH-UP	Applied with the channel selection by means of the remote control. The channel-up output is obtained from pin 7 by means of this operation.
10	O	Lo	P. FAIL	Power failure is detected at Lo, and inhibits input/output of μP during the back-up period. This causes no indication on the display during the back-up period.
11	O	—	CLOCK	Receives the clock pulse which is a standard of the μP.
12	—	—	—	—
13	O	Hi	Hz/Hr	Selects μP frequency and the time indication system by applying to the matrix pulse. Frequency selection: Connected to pin 23 → 60 Hz Non-connected → 50 Hz Indication selection: Connected to pin 24 → 24 Hrs Connected to pin 25 → 12 Hrs
14	O	—	Vdisp	This is the — B power supply of the G1 ~ G8 output buffer (inside μP); by varying this potential, the output of G1 ~ G8 is limited to change brightness of the display.
15	O	Lo	RESET	Resets μP when the power is supplied.
18 19	O	—	OSC 1 OSC 2	External oscillator connection pins.
22 23 24 25	I	Hi	MAT 1 MAT 2 MAT 3 MAT 4	Generate the matrix pulse by combining G1 ~ G8 using keys. Store the programs in memories using this pulse. (Table A)
26	I	Hi	TIMER	Receives signal that it is the timer mode.
27	I	Hi	POWER	Receives signal that power is supplied to the VTR.

PIN	I/O	ACTIVE LEVEL	ABBREVIATION	FUNCTION
28	I	Hi	RECORD	Receives signal that it is in the record mode.
29	I	Hi	PAUSE	Receives signal that it is in the pause mode. * The conditions shown in the table B become possible by combining 4 types of the input shown above.
30	O	Hi	16 CH	Instructs to select the channel of 16 CHs with the timer standby and power OFF.
32 33 34 35 36 37 38 39 40	O	Hi	a, 3 b, 2 c, ON, AM, PF d, OFF, PM, CH e f g 1 ~ 8 SUN ~	3: 3rd week 2: 2nd week Display segments driving output. * Synchronizes with the grid driving pulses G ₁ ~ G ₈ and lights. Programme number Day of the week

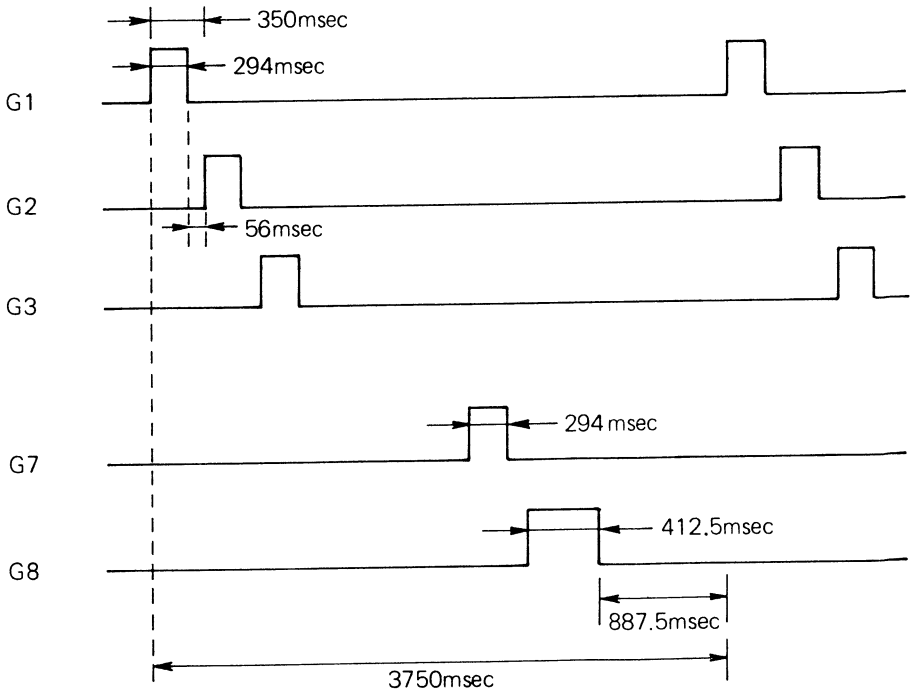



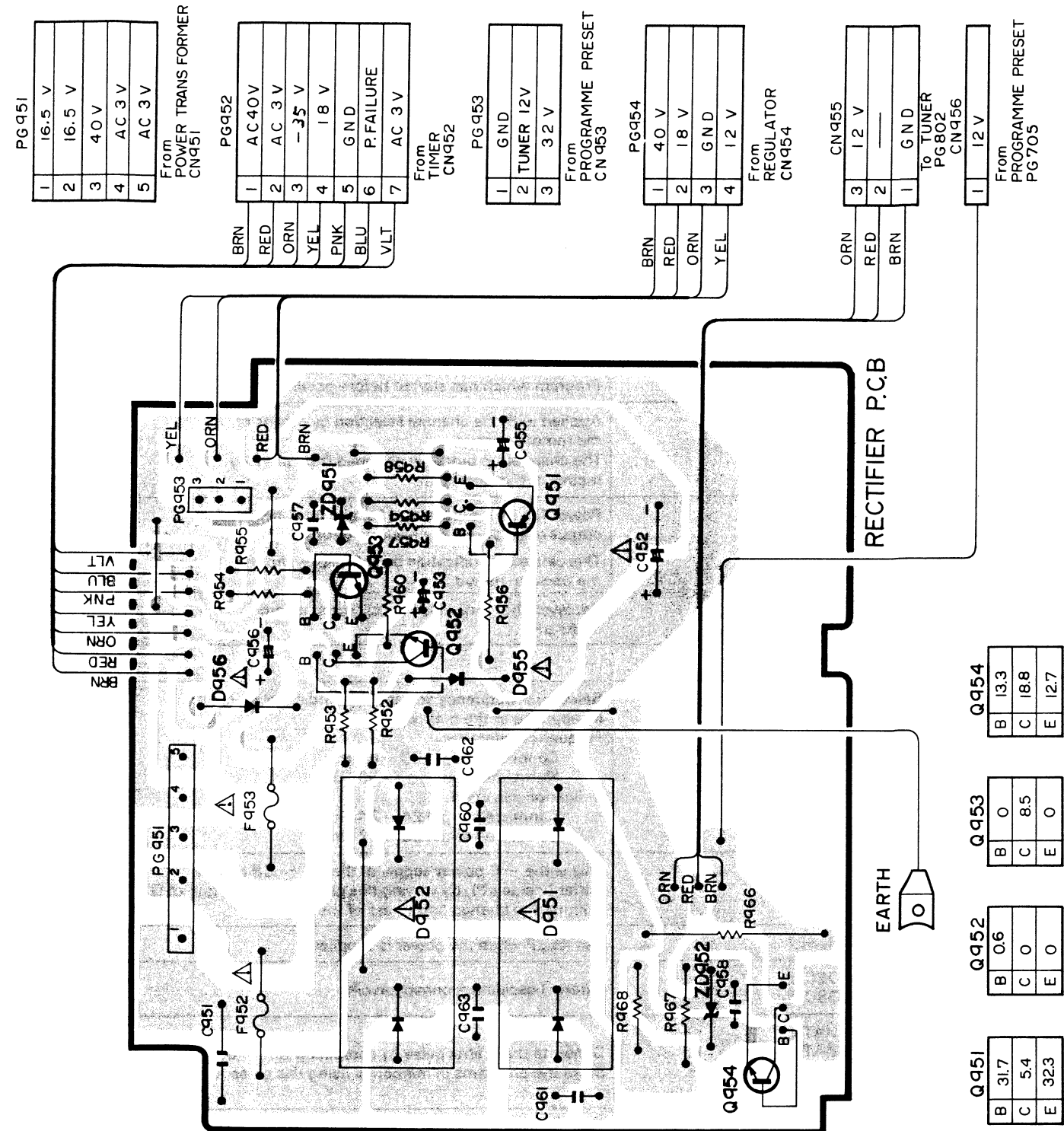
Fig - A 8 phase pulse

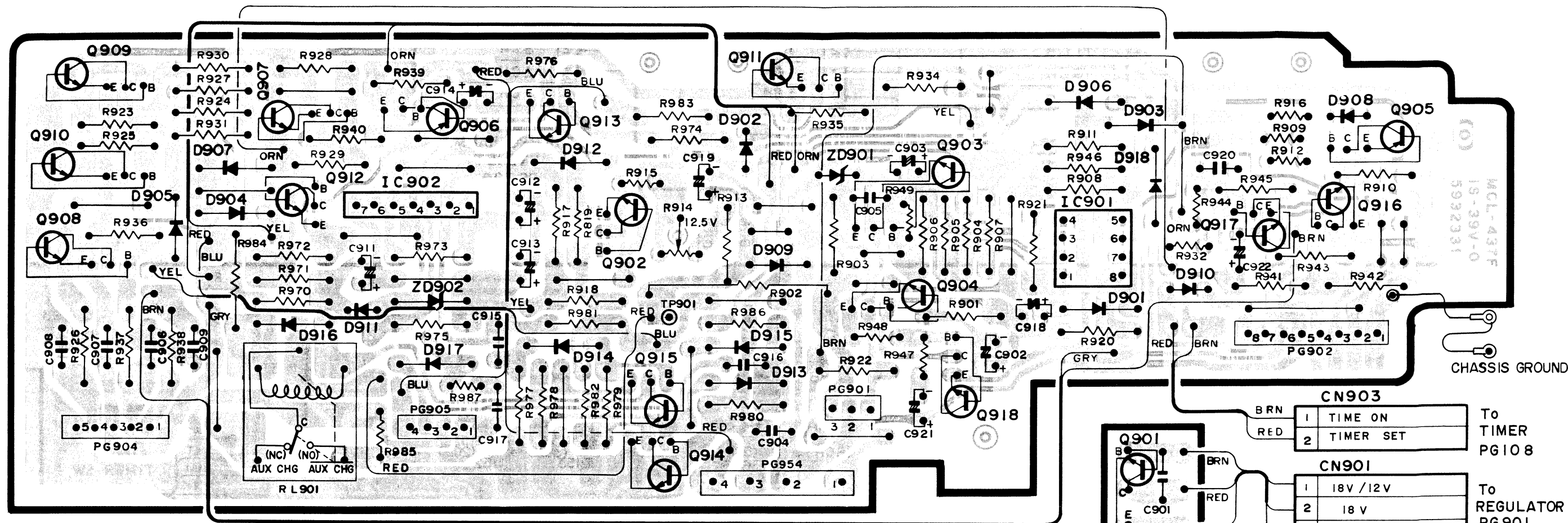
Table A 8-phase pulse and segment drive pulse, matrix pulse

	8 PHASE PULSE							
	G8	G7	G6	G5	G4	G3	G2	G1
②② MAT 1	1 CH	2 CH	3 CH	4 CH	1 SUN	2 MON	3 TUE	PROG
②③ MAT 2	5 CH	6 CH	7 CH	8 CH	4 WED	5 THU	6 FRI	CLEAR
②④ MAT 3	9 CH	10 CH	11 CH	12 CH	7 SAT	8 DAILY	9 WEEKLY	
②⑤ MAT 4					0 N.W.	AM/PM	HR/MIN	CLOCK
③② ~ ④① (SEGMENT DRIVE PULSE)	23	SUN	MON	TUE	WED	THU	FRI	SAT
	ON	AM	$\begin{array}{c} \text{a} \\ \text{1} \text{ } \text{g} \text{ } \text{b} \\ \text{c} \end{array}$	$\begin{array}{c} \text{a} \\ \text{1} \text{ } \text{g} \text{ } \text{b} \\ \text{c} \end{array}$	0	$\begin{array}{c} \text{a} \\ \text{1} \text{ } \text{g} \text{ } \text{b} \\ \text{c} \end{array}$	$\begin{array}{c} \text{a} \\ \text{1} \text{ } \text{g} \text{ } \text{b} \\ \text{c} \end{array}$	PF
	OFF	PM	$\begin{array}{c} \text{a} \\ \text{1} \text{ } \text{g} \text{ } \text{b} \\ \text{c} \end{array}$	$\begin{array}{c} \text{a} \\ \text{1} \text{ } \text{g} \text{ } \text{b} \\ \text{c} \end{array}$	0	$\begin{array}{c} \text{a} \\ \text{1} \text{ } \text{g} \text{ } \text{b} \\ \text{c} \end{array}$	$\begin{array}{c} \text{a} \\ \text{1} \text{ } \text{g} \text{ } \text{b} \\ \text{c} \end{array}$	CH
	1	2	3	4	5	6	7	8

Table B VTR conditions and possible operations.

VTR CONDITION	Condition input				Operation object					Other outputs		
	TIMER (26)	POWER (27)	RECORD (28)	PAUSE (29)	PRG KEYS	CH KEYS	REMOTE CH	REC	PAUSE	TIME ON (8)	16 CH (30)	CH-UP (7)
The condition when the μ P is reset with only the power plug is connected to the AC outlet.	Lo	Lo	Lo	Lo	○	○	×	×	×	Lo	Hi	Lo
Other mode than the REC mode with only the operation switch is set ON.	Lo	Hi	Lo	Lo	○	○	○	○	○	Lo	Lo	Lo
REC mode. REC/PAUSE mode.	Lo Lo	Hi Hi	Hi Hi	Lo Hi	×	×	×	○ ○	○ ○	Lo Lo	Lo Lo	Lo Lo
Timer REC stand-by mode.	Hi	Lo	Lo	Lo	○	○	×	×	×	Lo	Hi	Lo
Timer recording start.	Hi	Hi	Hi	Lo	×	×	×	○	×	Hi	Lo	
During timer-recording.	Hi	Hi	Hi	Lo	×	×	×	×	×	Hi	Lo	Lo
Timer-recording finish (Program stand-by.)	Hi	Lo	Lo	Lo	○	○	×	×	×	Lo	Hi	Lo





REGULATOR P.C.B

POWER P.C.B

Q901	Q902	Q903	Q904
B 14.0 (50~192)	B 0(0.7)	B 8.0	B 0.2
C 21.5	C 0.0(0.1)	C 14.1	C 14.1
E 12.8 (14~18)	E 0	E 7.4	E 0

IC902						
7	6	5	4	3	2	1
5.9 (5.9)	0.1 (6.6)	0 (1.8)	0 (0.1)	5.9 (5.9)	0.1 (6.6)	3.0 (3.0)

IC901			
4	0	5	11.6
3	12.7	6	12.5
2	12.5	7	1.2
1	20.3	8	21.6

Q905	Q906	Q907	Q908	Q909	Q910	Q911	Q912	Q913
B 11.7	B 11.7	B 0.7	B 0	B 0	B 0.7	B 0(0.7)	B 0	B 0(7)
C 10.4	C 12.8	C 0.1	C 0.7	C 16.5	C 0	C 10.9 (0.1)	C 0.7 (7.2)	C 0(0)
E 12.5	E 12.5	E 0	E 0	E 0	E 0	E 0(0)	E 0	E 0(0)

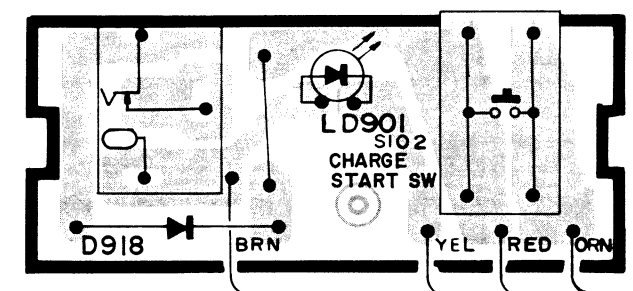
Q914	Q915	Q916	Q917	Q918
B 0(0) (0.8)	B 0.7(0.7) (0.1)	B -0.2	B 0.7	B 0
C 2.0(19.7) (0.1)	C 0(0) (14.6)	C 0.7	C 0	C 0.2
E 0(0)	E 0(0)	E 0	E 0	E 0

PG901
1 18V/12V
2 18V
3 18V/12V

PG902
1 GND
2 TIMER SET
3 TIME ON
4 TIME ON
5 18V
6 18V/12V
7 CHARGE INDI
8 TIMER INDI

PG904
1 TIME ON
2 PB HI
3 18V/12V
4 VTR ON
5 GND

PG905
1 18V/12V
2 GND
3 START
4 CHARGE INDI



AUX BATT. CHARGE JACK P.C.B

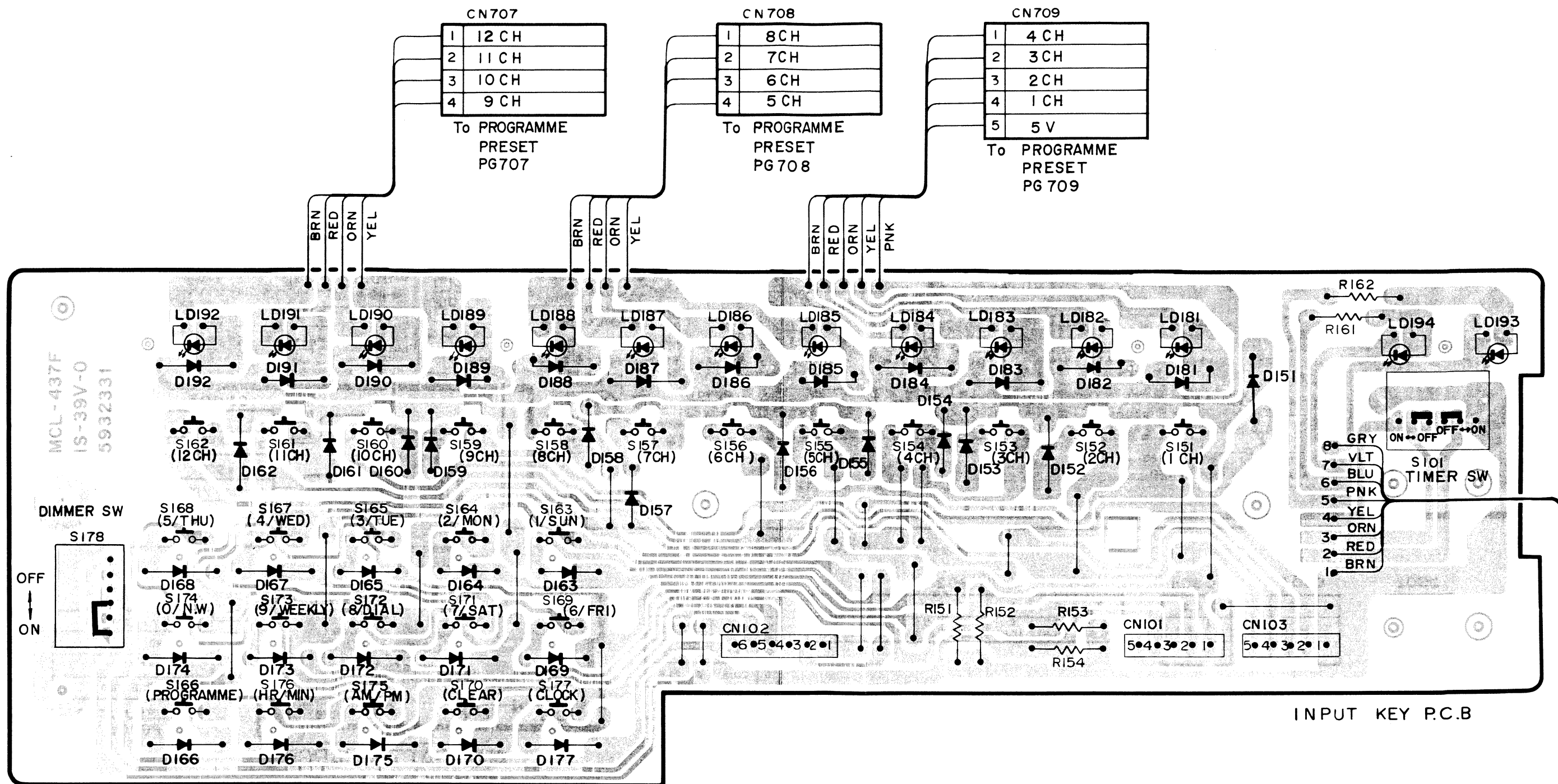
CN905
BRN 1 18V/12V
RED 2 GND
ORN 3 START
YEL 4 CHARGE INDI

From
RECTIFIER
CN954

PG945
1 40V
2 18V
3 GND
4 TUNER 12V

From
INPUT KEY
CN151

* VOL TAGES OF EACH MODE ARE SHOWN AS FOLLOWS
0.6 — ADAPTER MODE
(0.6) — VTR INT. BATTERY CHARGING MODE
(1.3) — AUX. BATTERY CHARGING MODE



CN101	
1	MAT. 1
2	MAT. 2
3	MAT. 3
4	MAT. 4
5	GND

To
TIMER
PG101

CN102	
1	G 4
2	G 3
3	G 2
4	G 1
5	DIM 1
6	DIM 2

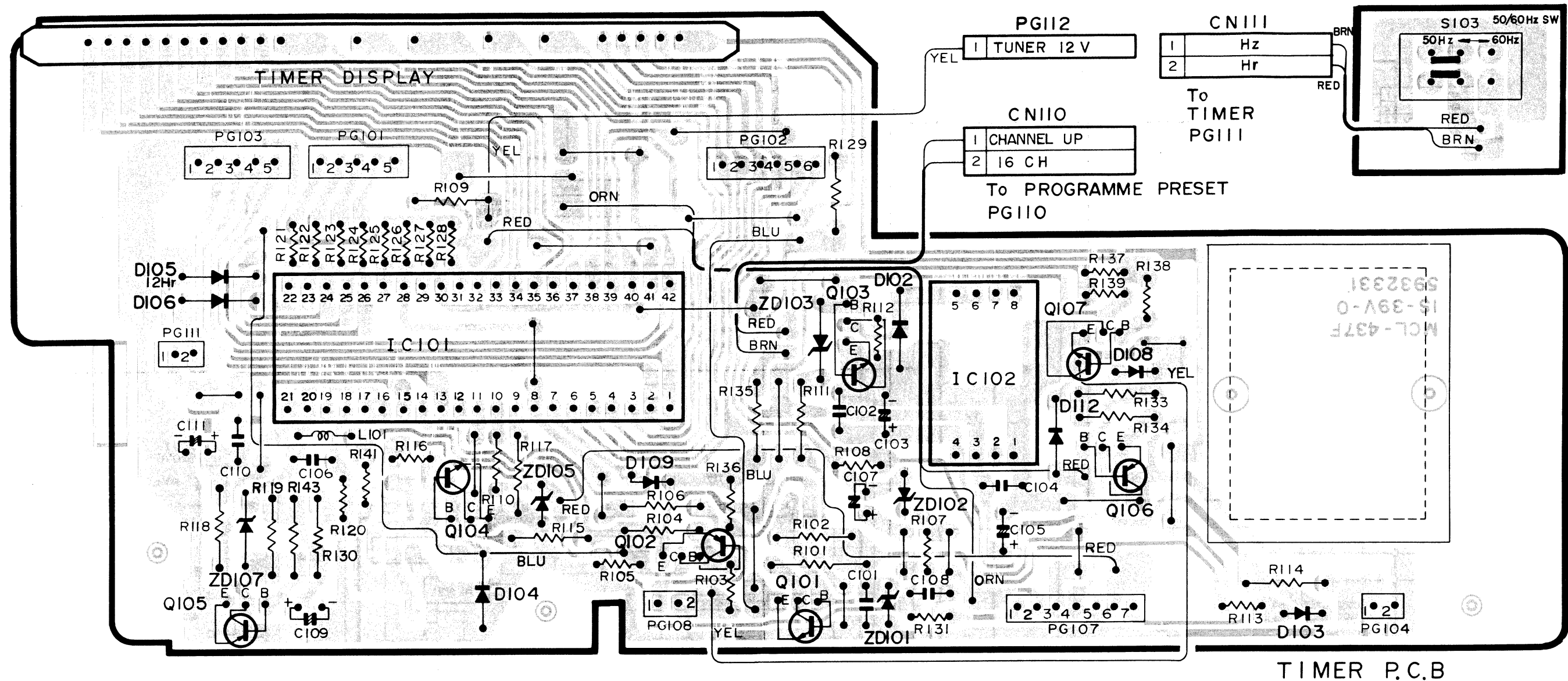
To
TIMER
PG102

CN103	
1	GND
2	G 5
3	G 6
4	G 7
	G 8

To
TIMER
PG103

CN151		
1	GND	BRN
2	TIMER SET	RED
3	TIME ON	ORN
4	TIME ON	YEL
5	18V	PNK
6	18V/12V	BLU
7	CHARGE INDI	VLT
8	TIMER INDI	GRY

From
REGULATOR
PG902



IC101

22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
0	0	0	0	0(10.5)	9.2	-2.2	0	0	0	—	—	—	—	—	—	—	—	—	—	—
21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
10.5	10.5	—	7.4	0	0	0	-22.4	-22.0	—	4.7	8.4	0	-2.2	10.2	—	—	—	—	—	—

IC102

5	6	7	8
0	—	—	—
4	3	2	1
2.7	10.5	—	0

PG101

1	2	3	4	5
MAT. 1	MAT. 2	MAT. 3	MAT. 4	—

From
INPUT KEY
CN101

PG102

1	2	3	4	5	6
G4	G3	G2	G1	DIM1	DIM2

From
INPUT KEY
CN102

PG103

1	2	3	4	5
GND	G5	G6	G7	G8

From
INPUT KEY
CN103

PG104

1	2
BATT.	GND

From
BACK UP
BATTERY
CN104

PG107

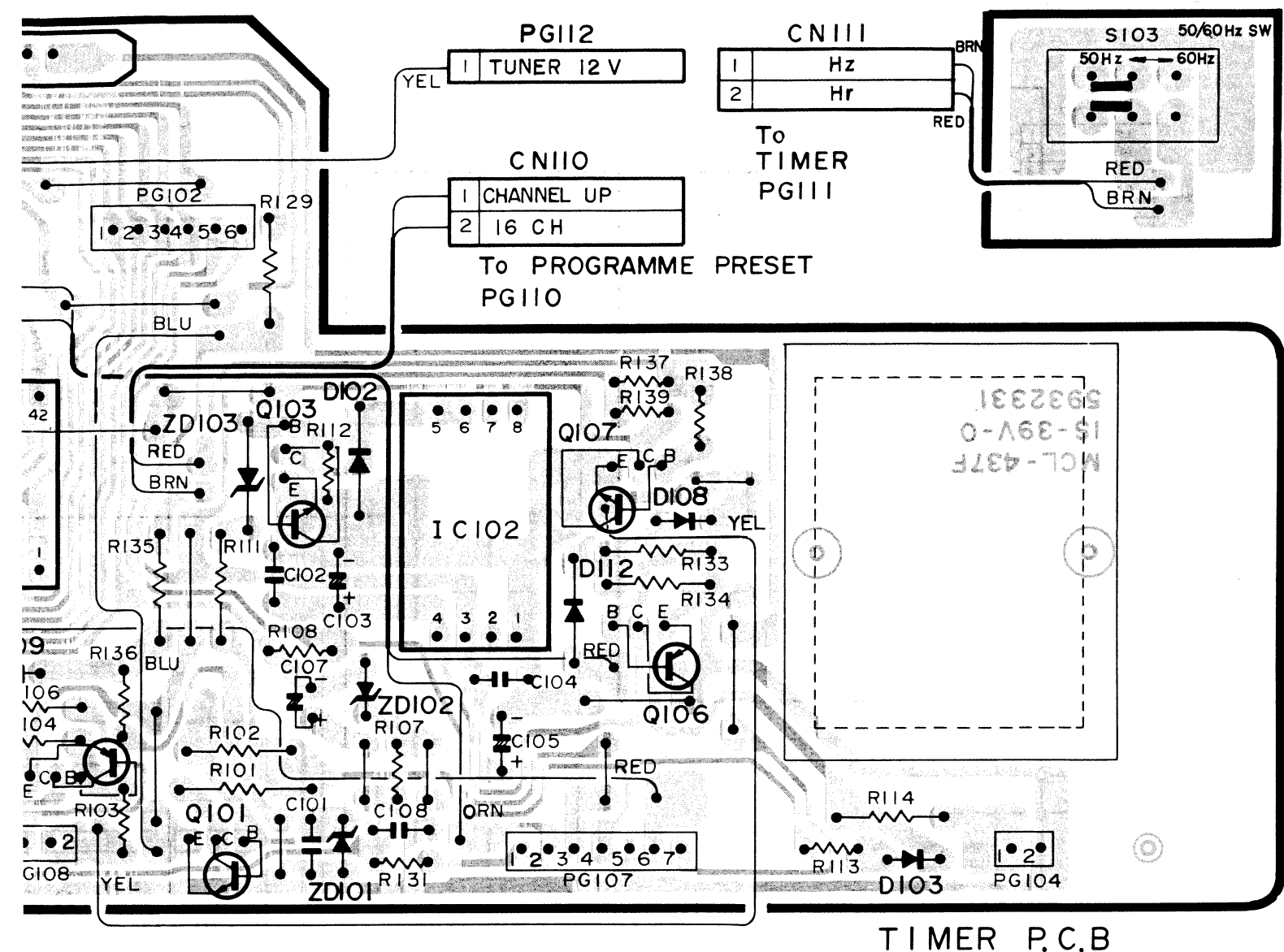
1	2	3	4	5	6	7
AC40V	AC3V	-40V	18V	GND	P FAILURE	AC3V

From
RECTIFIER
CN952

PG108

1	2
TIME ON	TIME SET

From
REGULATOR
CN903



Q101	
B	11.9
C	21.0
E	10.5

Q102	
B	10.5 (9.9)
C	0 (10.5)
E	10.5

Q103	
B	0.7
C	0
E	0

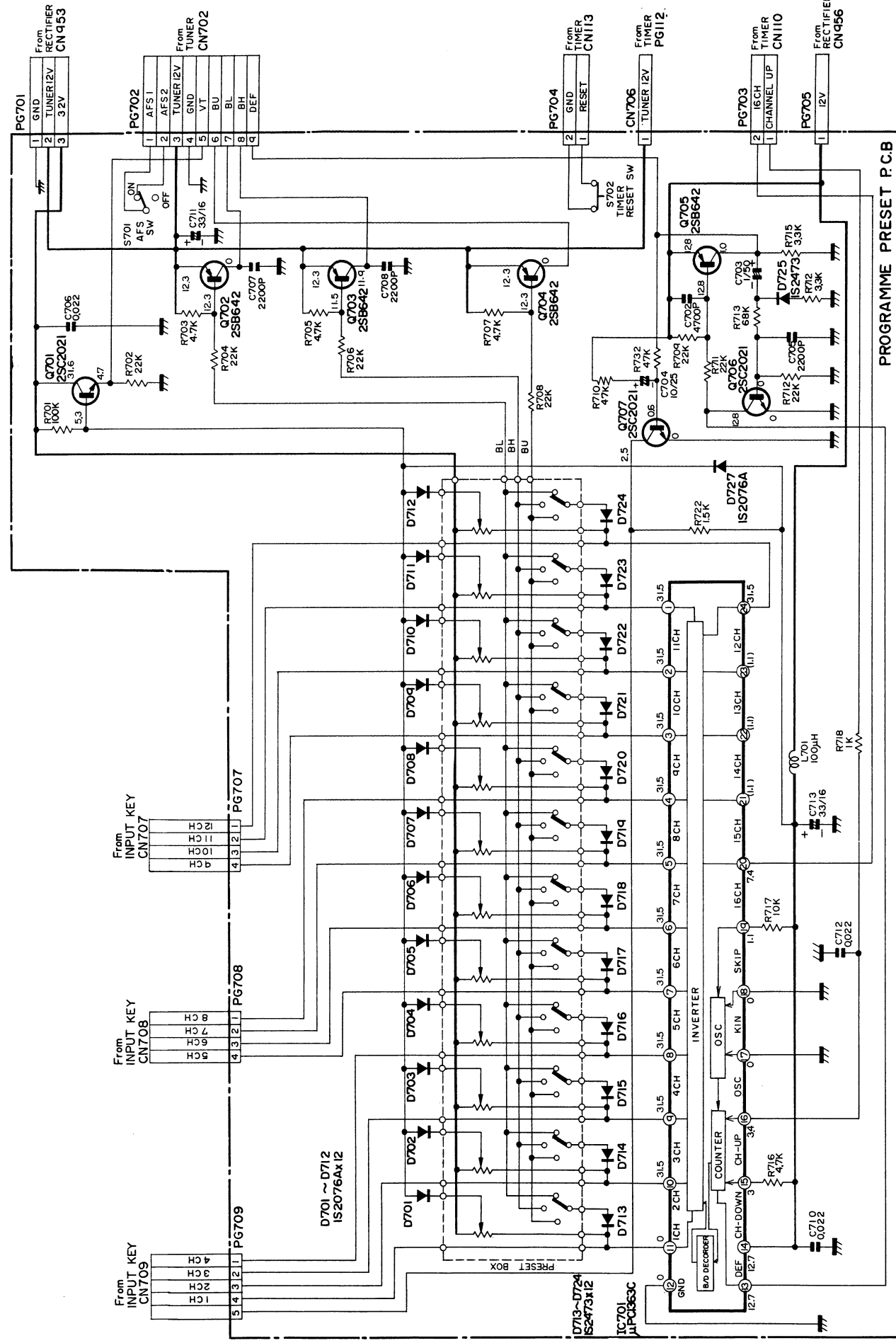
Q104	
B	—
C	4.7
E	0

Q105	
B	10.5
C	0
E	10.5

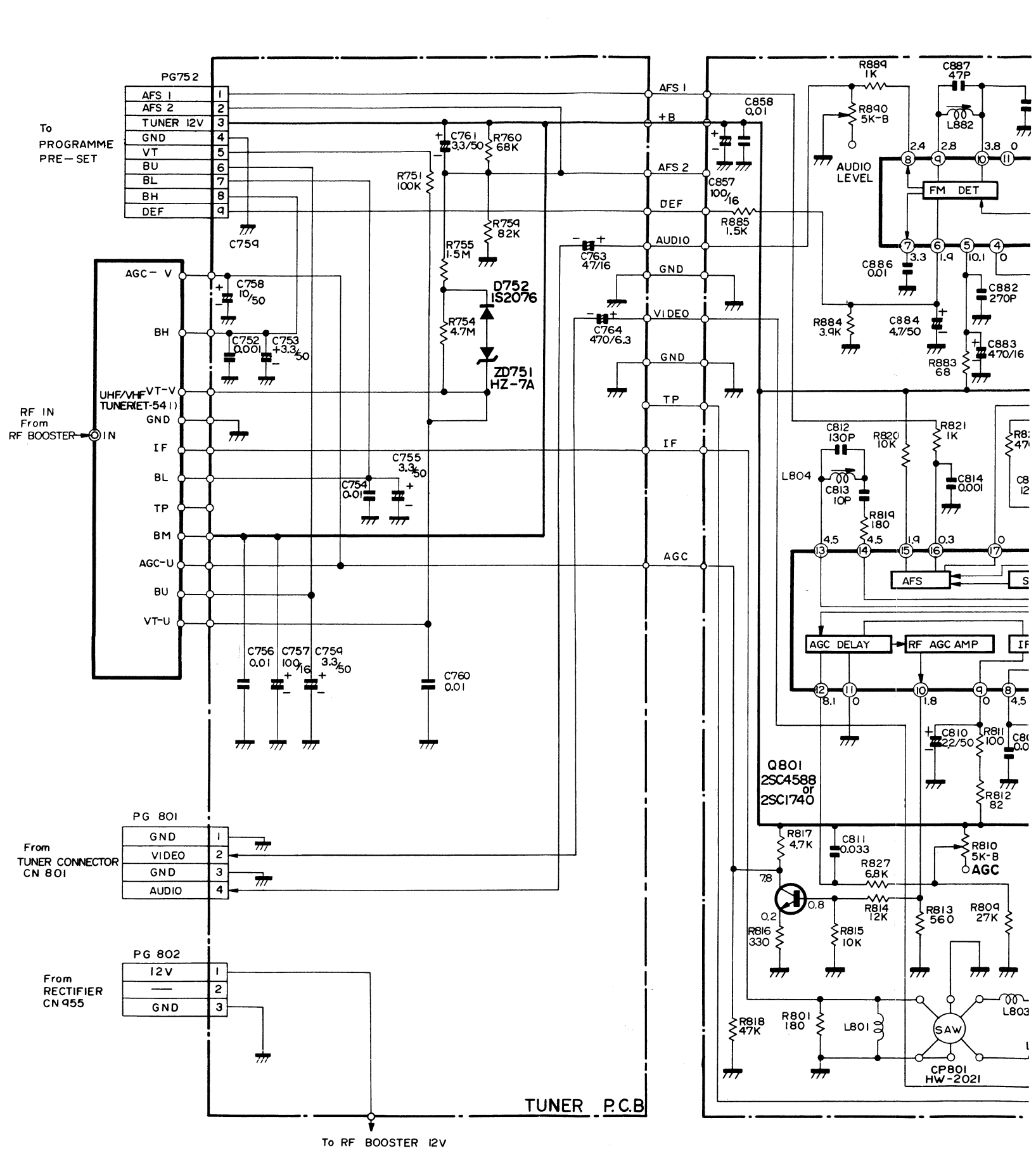
Q106	
B	—
C	2.7
E	2.7

Q107	
B	0.6
C	0
E	0

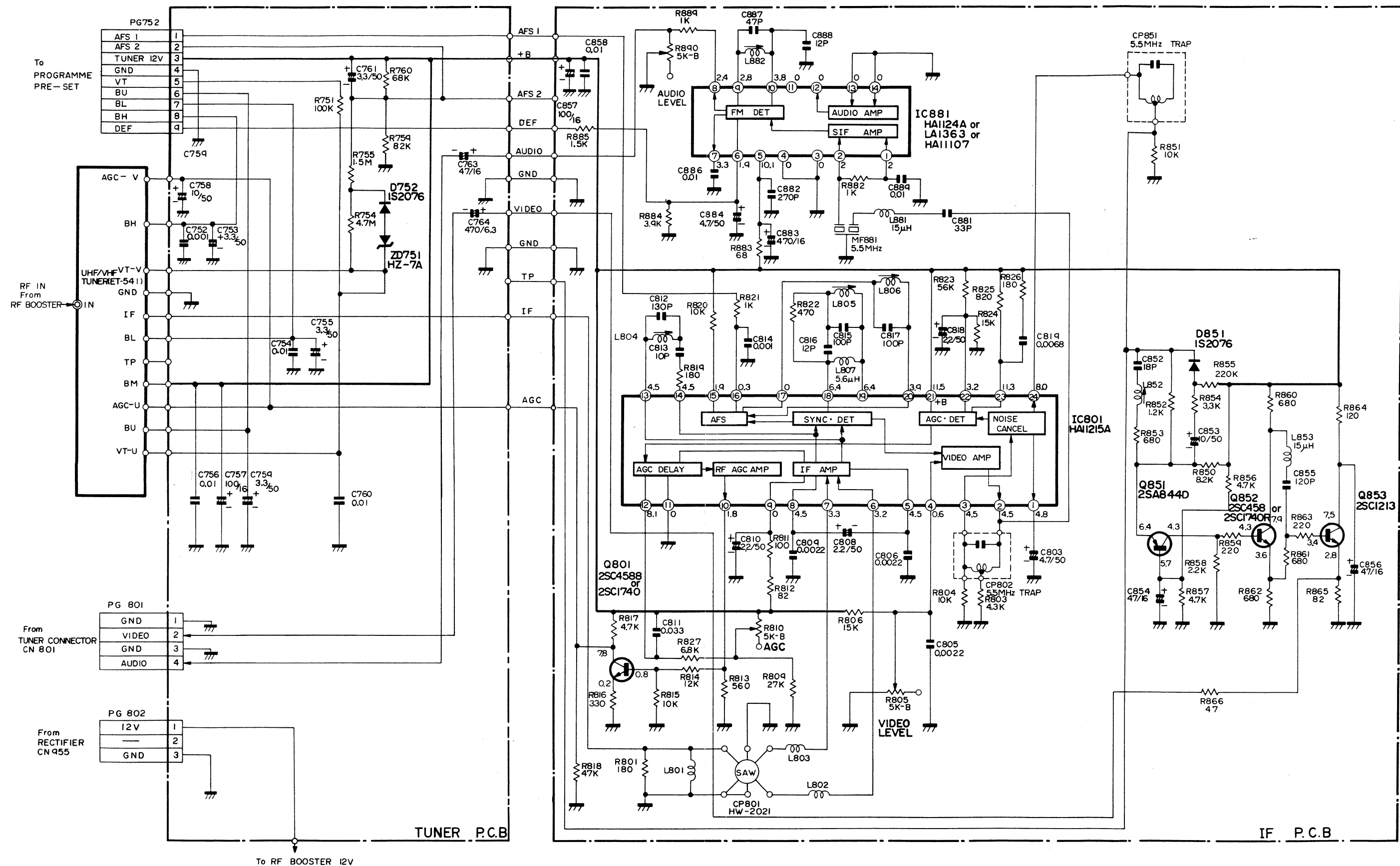
PROGRAMM PRESET [Expect for the UK model]



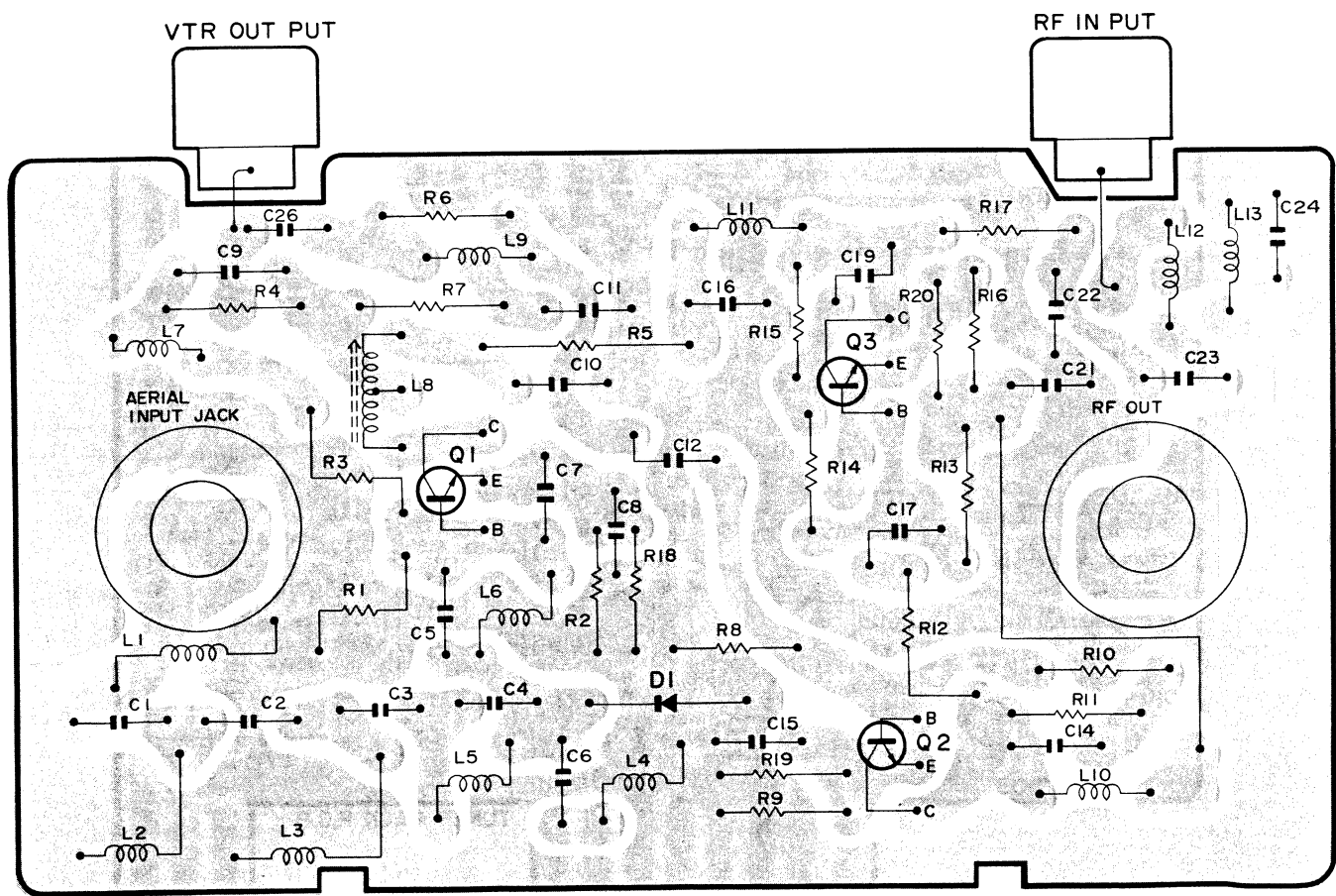
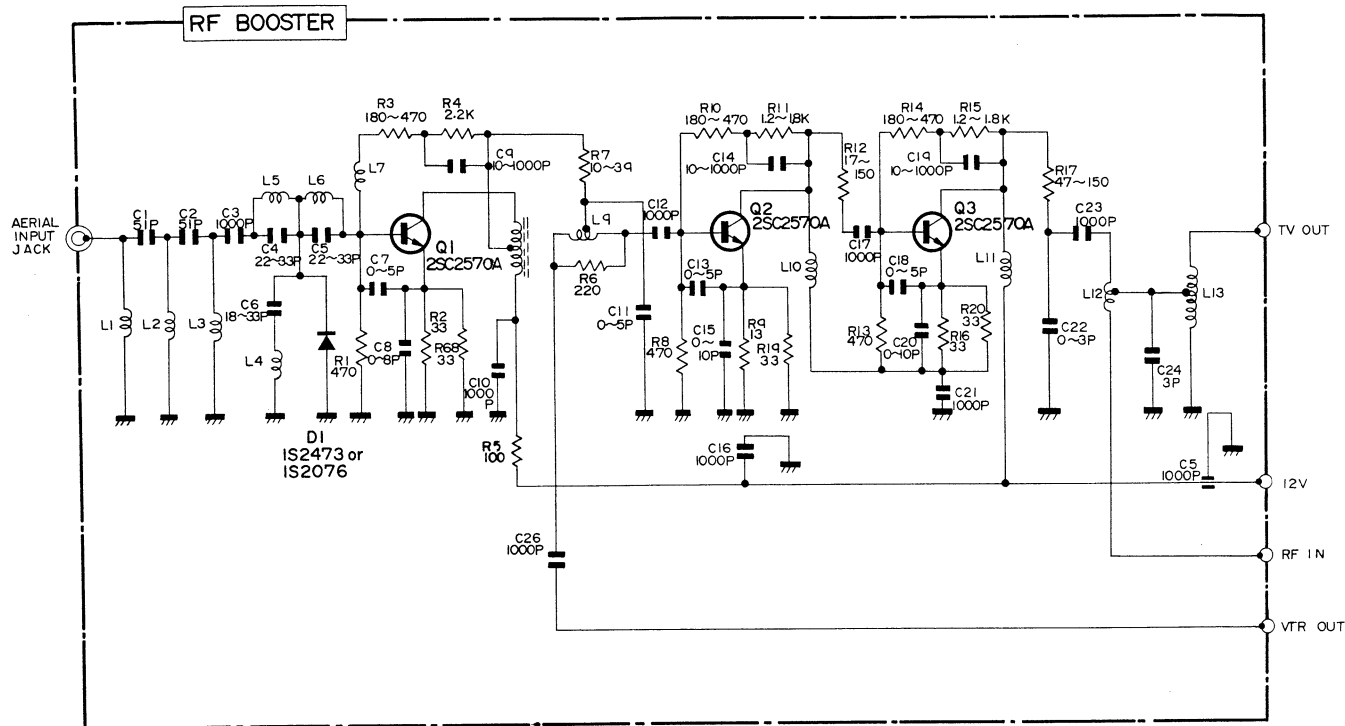
TUNER IF [Expect for the UK model]



TUNER IF [Expect for the UK model]

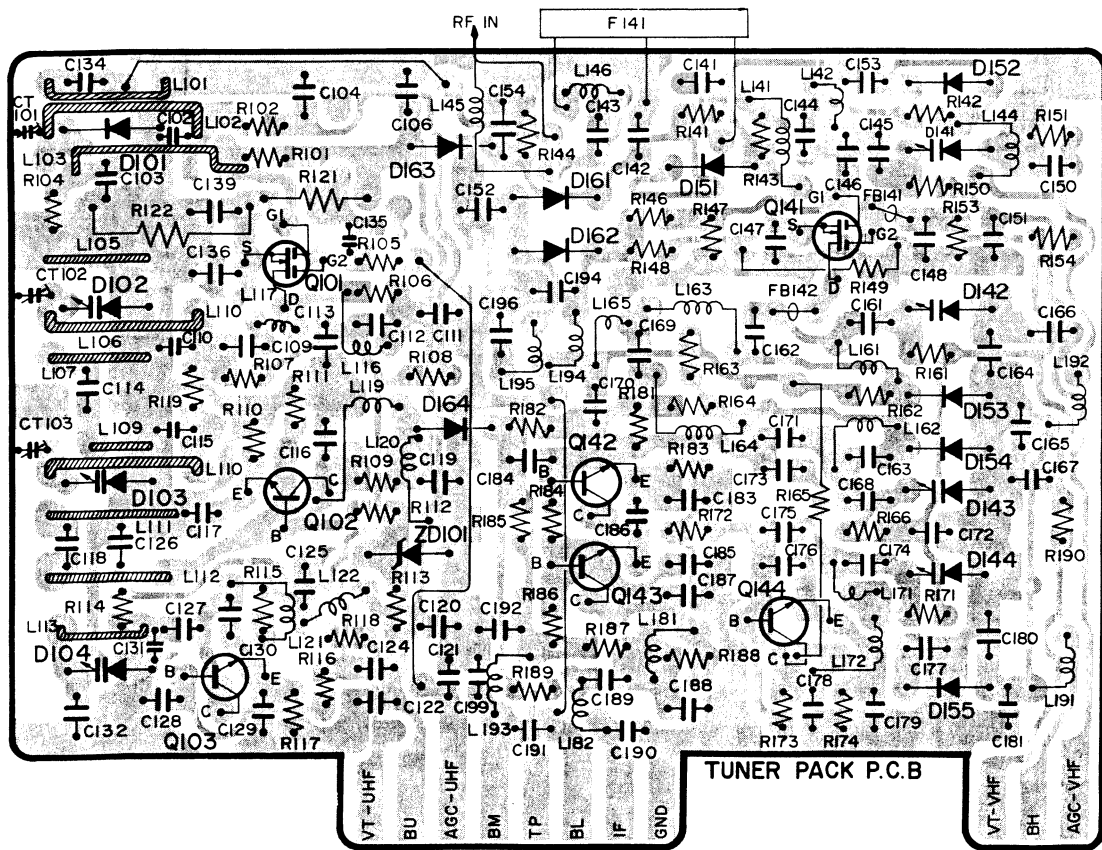
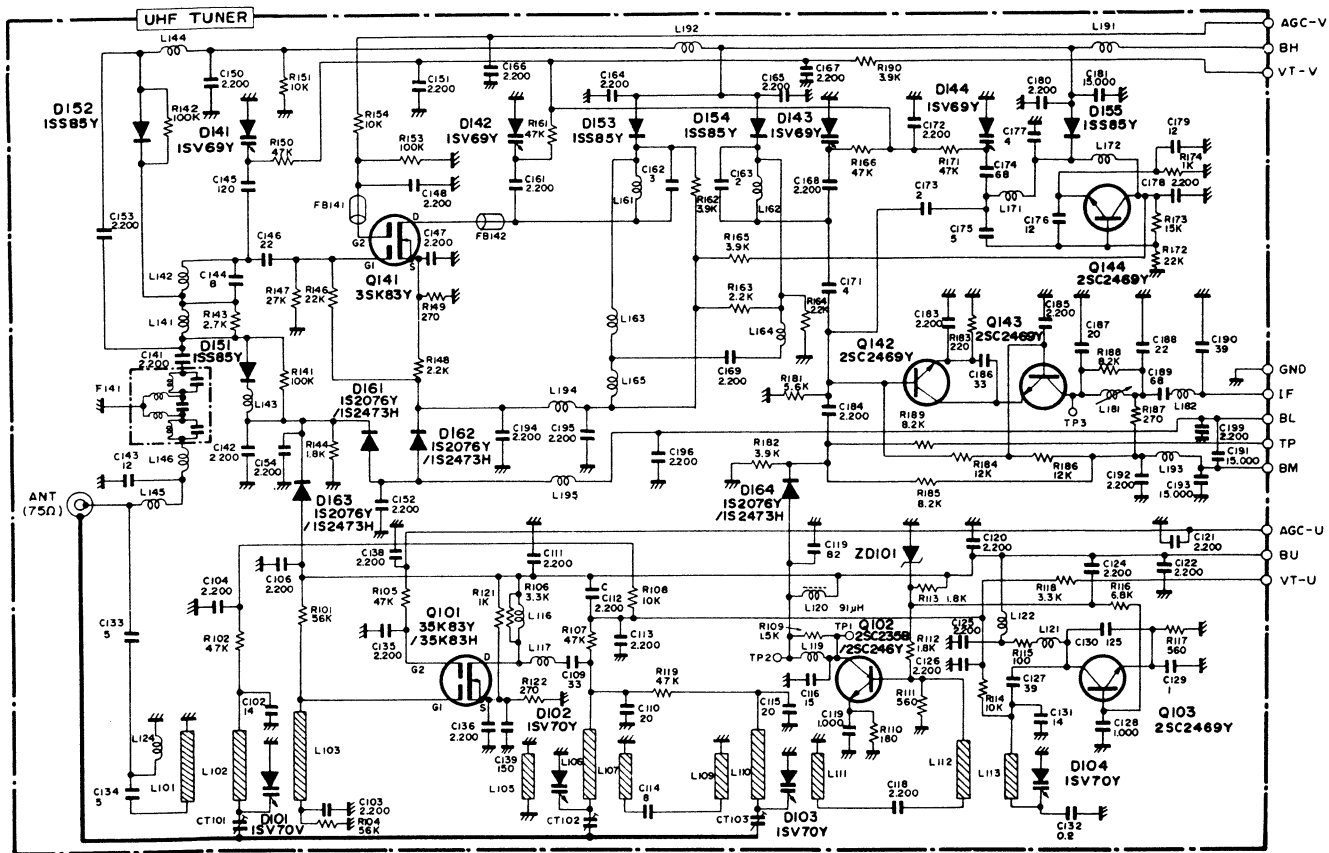


RF BOOSTER



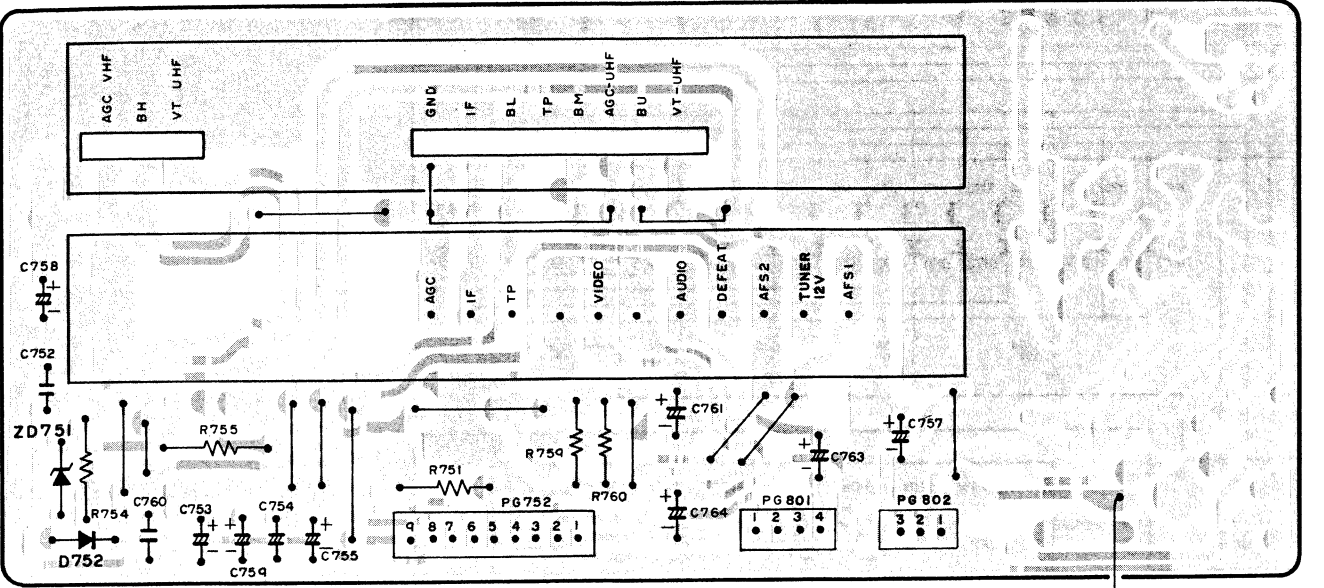
TUNER/IF [Except for the UK model]

ET-541



To TUNER P.C.B

Except for the UK model



PG 752

1	AFS 1
2	AFS 2
3	TUNER 12V
4	GND
5	VT
6	BU
7	BL
8	BH
9	DEFEAT

From PROGRAM PRESET
PG 732

PG 801

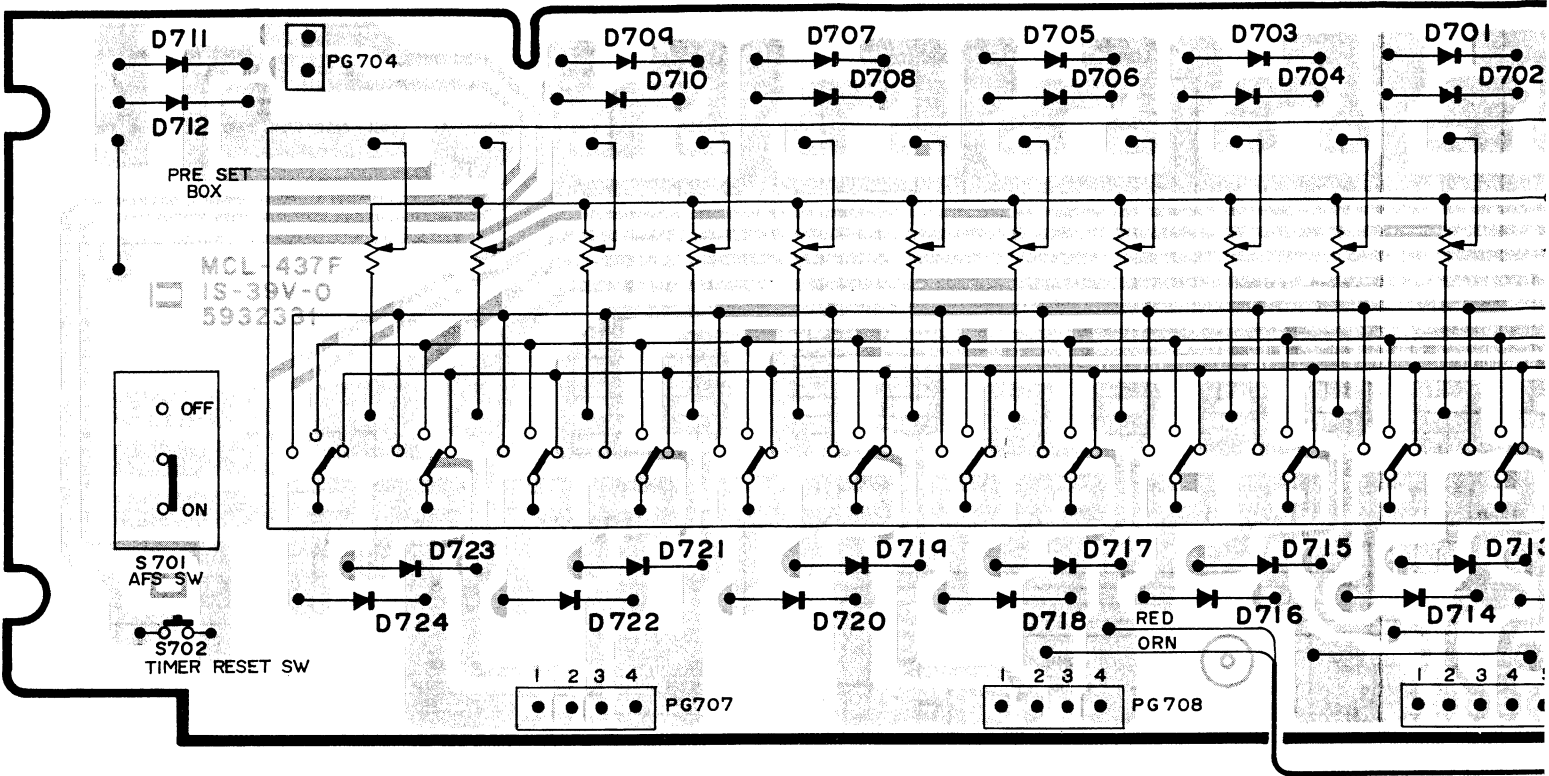
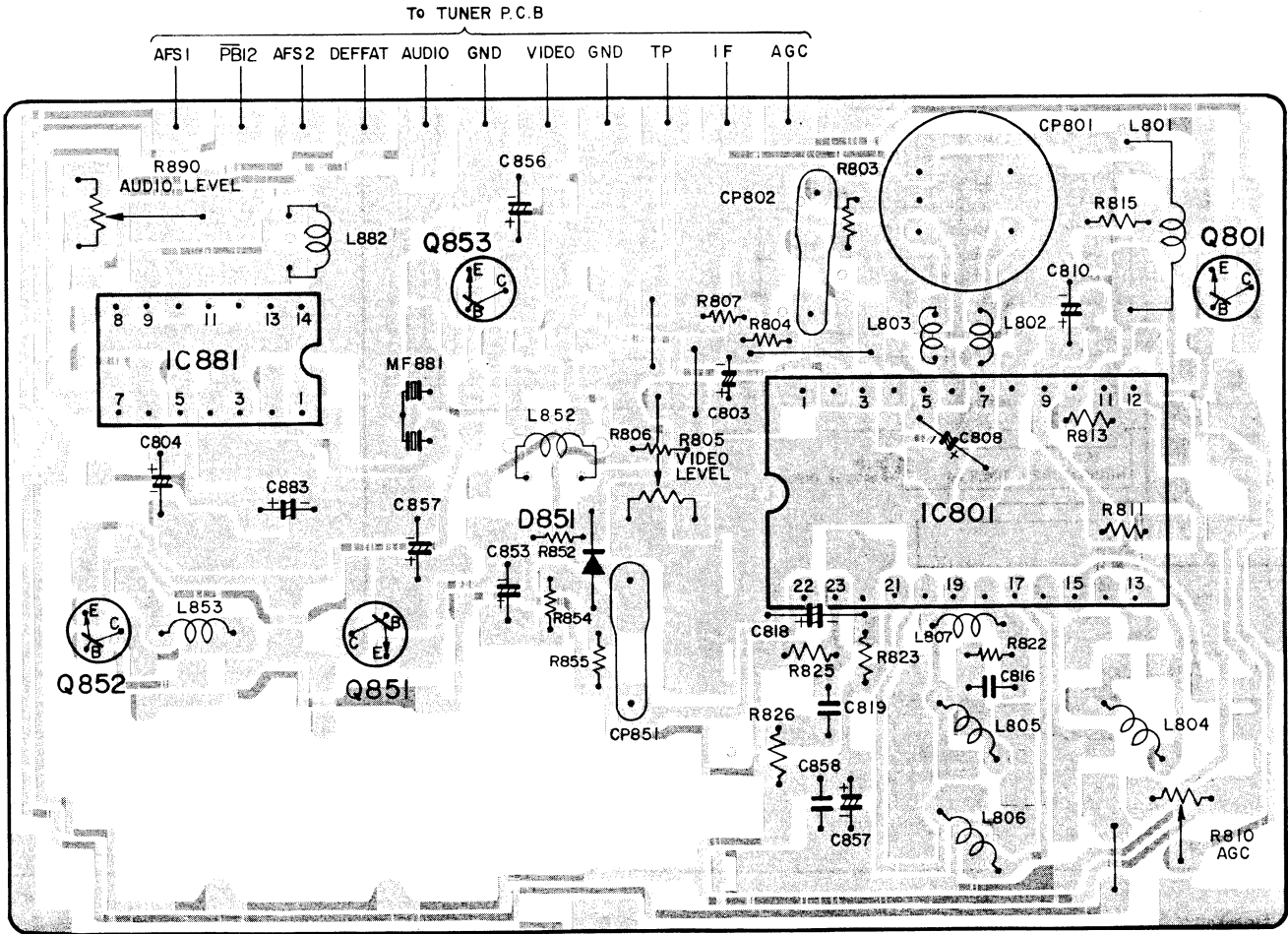
1	GND
2	VIDEO OUT
3	GND
4	AUDIO

From
TUNER CONNECTOR
CN 801

PG 802

1	12V
2	
3	GND

From
RECTIFIER
CN 955



PG 707

1	12 CH
2	11 CH
3	10 CH
4	9 CH

From
INPUT KEY
CN 707

PG 701

1	GND
2	TUNER 12V
3	32V

From
RECTIFIER
CN 701

PG 708

1	8 CH
2	7 CH
3	6 CH
4	5 CH

From
INPUT KEY
CN 708

PG 702

1	AFS 1
2	AFS 2
3	TUNER 12V
4	GND
5	VT
6	BU
7	BL
8	BH
9	DEFEAT

From
TUNER/IF
CN 702

PG 709

1	4 CH
2	3 CH
3	2 CH
4	1 CH
5	5V

From
INPUT KEY
CN 709

PG 703

1	16 CH
2	CHANNEL UP

From
TIMER
CN 703

PROGRAMME PRES

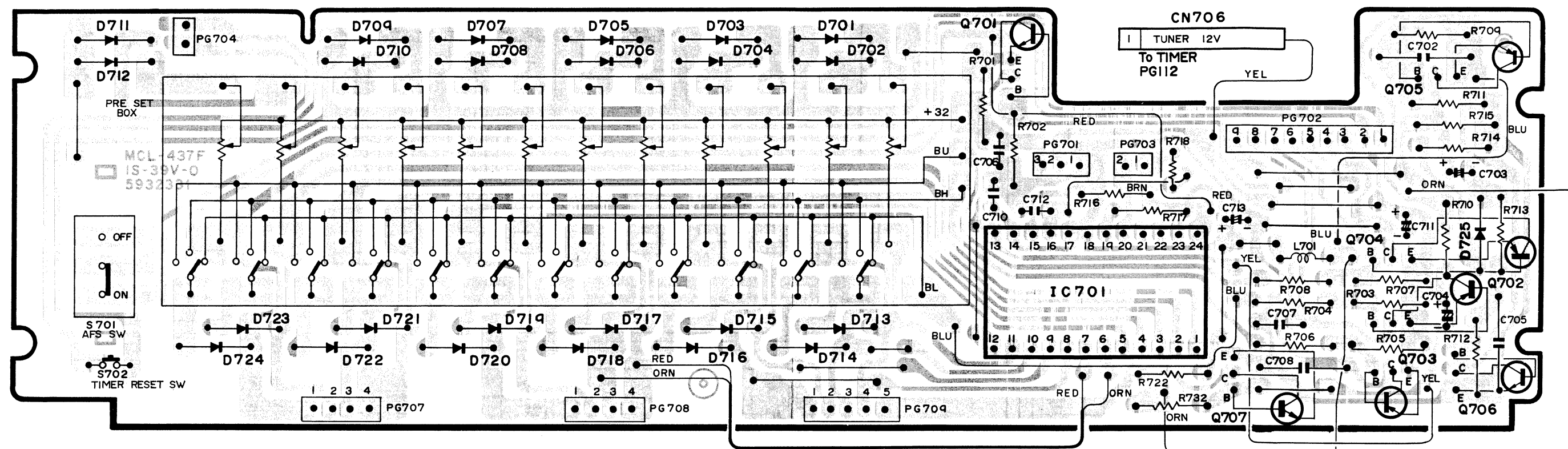
PG 704

1	RESET
2	GND

From
TIMER
CN 704

Q 701

B	5.3
C	31.6
E	4.7



PROGRAMME PRESET P.C.B

PG707	
1	12 CH
2	11 CH
3	10 CH
4	9 CH

From
INPUT KEY
CN707

PG701	
1	GND
2	TUNER 12V
3	32V

From
RECTIFIER
CN701

PG708	
1	8 CH
2	7 CH
3	6 CH
4	5 CH

From
INPUT KEY
CN708

PG702	
1	AFS 1
2	AFS 2
3	TUNER 12V
4	GND
5	VT
6	BU
7	BL
8	BH
9	DEFEAT

From
TUNER/IF
CN702

PG709	
1	4 CH
2	3 CH
3	2 CH
4	1 CH
5	5V

From
INPUT KEY
CN709

PG703	
1	16 CH
2	CHANNEL UP

From
TIMER
CN703

PG704	
1	RESET
2	GND

From
TIMER
CN704

IC701											
13	14	15	16	17	18	19	20	21	22	23	24
12.7	12.7	3.0	3.4	0	0	1.1	7.4	(1.1)	(1.1)	(1.1)	31.5
12	11	10	9	8	7	6	5	4	3	2	1
0	0	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5

Q701	
B	5.3
C	31.6
E	4.7

Q702	
B	12.3
C	0
E	12.3

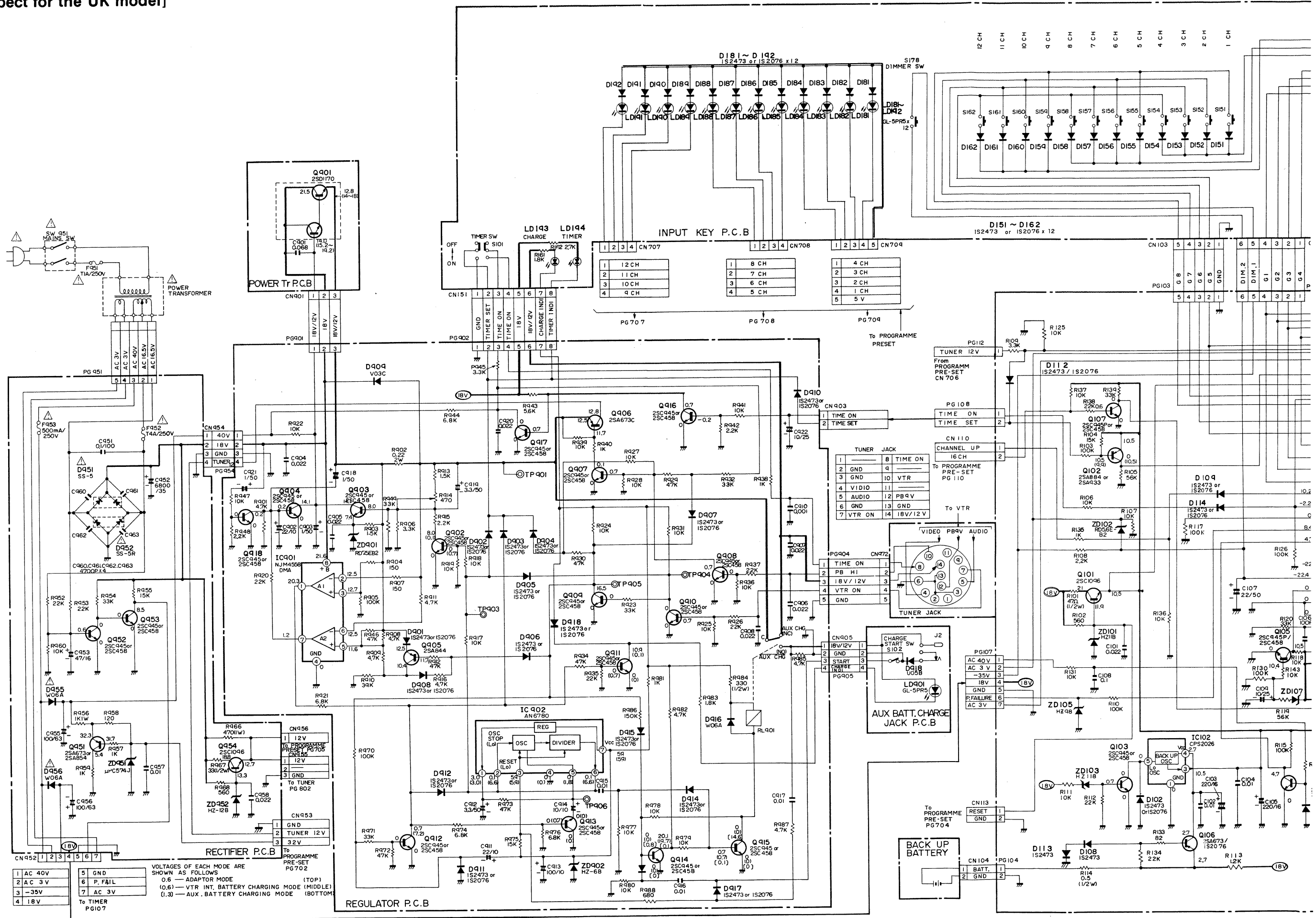
Q703	
B	11.5
C	11.9
E	12.3

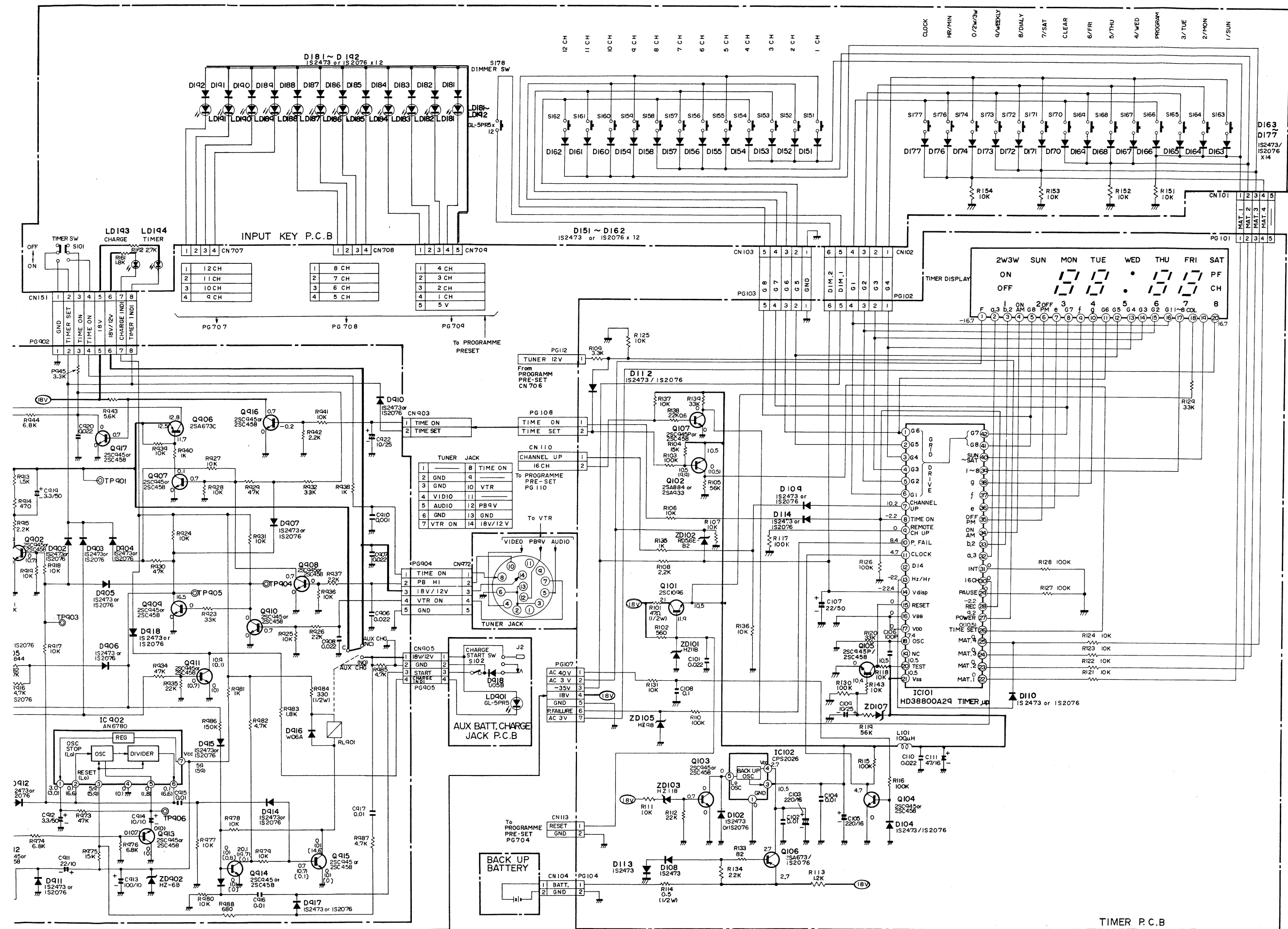
Q704	
B	12.3
C	0
E	12.3

Q705	
B	12.8
C	1.0
E	12.8

Q706	
B	0
C	12.8
E	0

Q707	
B	0.6
C	2.5
E	0





μP: HD38800A29
 (8PRO/3 WEEKS)

PIN	I/O	ACTIVE LEVEL	ABBREVIATION	FUNCTION
41 42 1 2 3 4 5 6	O	Hi	G ₈ G ₇ G ₆ G ₅ G ₄ G ₃ G ₂ G ₁	G ₅ — G ₈ : Channel selection matrix pulse forming and display grid driving pulse. G ₁ — G ₄ : Keyboard selction matrix pulse forming and display grid driving pulse. (Fig. A)
7	O	Lo → Hi	CHANNEL UP	This is a rectangular pulse with a width of 100 msec. When the 16CH pulse (30) is detected, this pin generates the same number of pulses as the tuned channels to perform channel selection.
8	O	Hi	TIME ON	Set to Hi, and Hi during recording. 1. Precedence of executing programs is as shown below. Those with earlier set time > Those with smaller program No. 2. Program to be executed when the power is restored. Program which has started before power failure.
9	O	Hi	REMOTE CH-UP	Applied with the channel selection by means of the remote control. The channel-up output is obtained from pin 7 by means of this operation.
10	O	Lo	P. FAIL	Power failure is detected at Lo, and inhibits input/output of μP during the back-up period. This causes no indication on the display during the back-up period.
11	O	—	CLOCK	Receives the clock pulse which is a standard of the μP.
12	—	—	—	—
13	O	Hi	Hz/Hr	Selects μP frequency and the time indication system by applying to the matrix pulse. Frequency selection: Connected to pin 23 → 60 Hz Non-connected → 50 Hz Indication selection: Connected to pin 24 → 24 Hrs Connected to pin 25 → 12 Hrs
14	O	—	Vdisp	This is the — B power supply of the G1 ~ G8 output buffer (inside μP); by varying this potential, the output of G1 ~ G8 is limited to change brightness of the display.
15	O	Lo	RESET	Resets μP when the power is supplied.
18 19	O	—	OSC 1 OSC 2	External oscillator connection pins.
22 23 24 25	I	Hi	MAT 1 MAT 2 MAT 3 MAT 4	Generate the matrix pulse by combining G1 ~ G8 using keys. Store the programs in memories using this pulse. (Table A)
26	I	Hi	TIMER	Receives signal that it is the timer mode.
27	I	Hi	POWER	Receives signal that power is supplied to the VTR.

PIN	I/O	ACTIVE LEVEL	ABBREVIATION	FUNCTION
28	I	Hi	RECORD	Receives signal that it is in the record mode.
29	I	Hi	PAUSE	Receives signal that it is in the pause mode. * The conditions shown in the table B become possible by combining 4 types of the input shown above.
30	O	Hi	16 CH	Instructs to select the channel of 16 CHs with the timer standby and power OFF.
32 33 34 35 36 37 38 39 40	O	Hi	a. 3 b. 2 c. ON, AM, PF d. OFF, PM, CH e f g 1 ~ 8 SUN ~	3: 3rd week 2: 2nd week Display segments driving output. * Synchronizes with the grid driving pulses G ₁ ~ G ₈ and lights. Programme number Day of the week

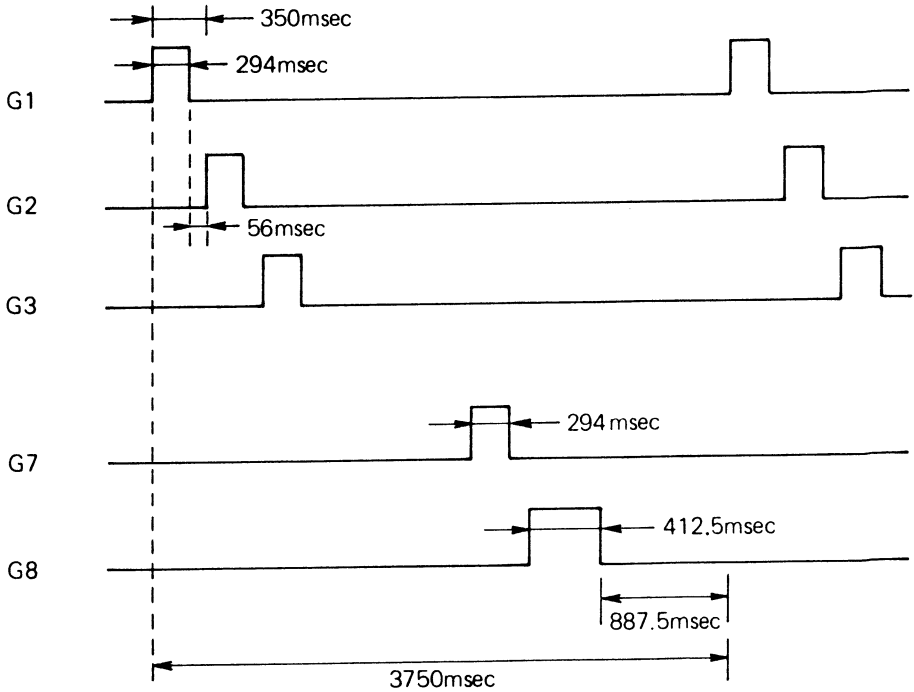


Fig - A 8 phase pulse

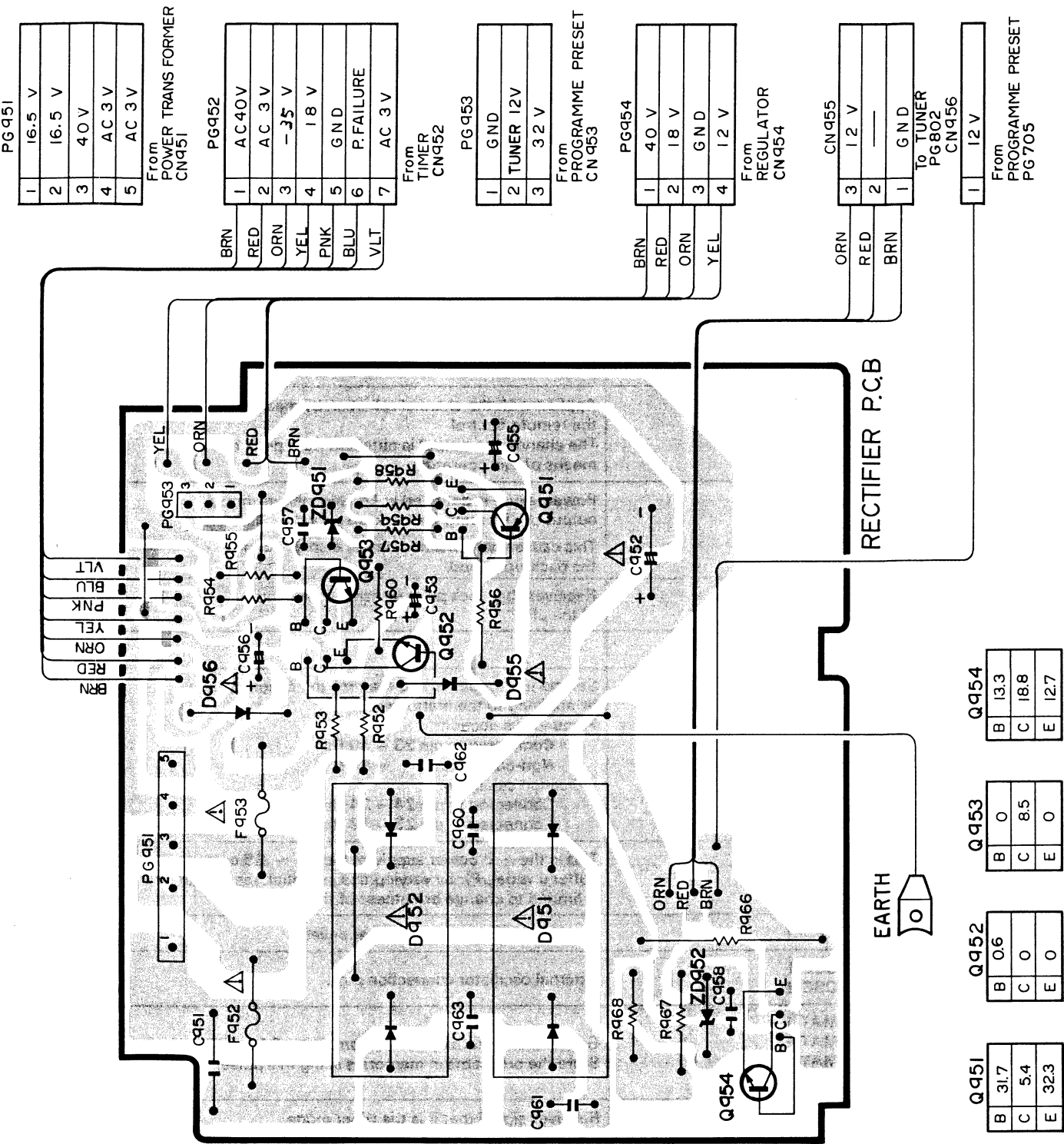
[Except for the UK model]

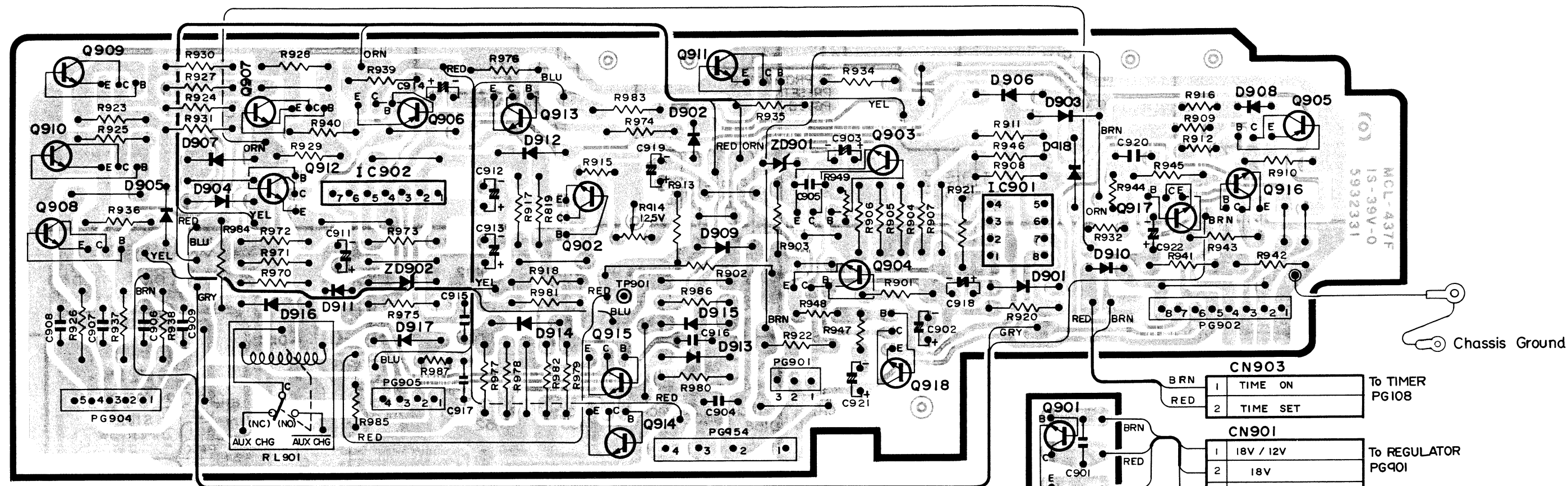
Table A 8-phase pulse and segment drive pulse, matrix pulse

	8 PHASE PULSE							
	G8	G7	G6	G5	G4	G3	G2	G1
②② MAT 1	1 CH	2 CH	3 CH	4 CH	1 SUN	2 MON	3 TUE	PROG
③③ MAT 2	5 CH	6 CH	7 CH	8 CH	4 WED	5 THU	6 FRI	CLEAR
④④ MAT 3	9 CH	10 CH	11 CH	12 CH	7 SAT	8 DAILY	9 WEEKLY	
⑤⑤ MAT 4					0 N.W.	AM/PM	HR/MIN	CLOCK
③② ~ ④① (SEGMENT DRIVE PULSE)	23	SUN	MON	TUE	WED	THU	FRI	SAT
	ON	AM			0			PF
	OFF	PM			0			CH
	1	2	3	4	5	6	7	8

Table B VTR conditions and possible operations.

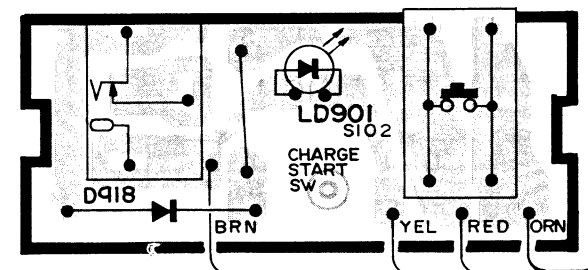
VTR CONDITION	Condition input				Operation object					Other outputs		
	TIMER ②⑥	POWER ②⑦	RECORD ②⑧	PAUSE ②⑨	PRG KEYS	CH KEYS	REMOTE CH	REC	PAUSE	TIME ON ②⑧	16 CH ③①	CH-UP ②⑦
The condition when the μ P is reset with only the power plug is connected to the AC outlet.	Lo	Lo	Lo	Lo	○	○	×	×	×	Lo	Hi	Lo
Other mode than the REC mode with only the operation switch is set ON.	Lo	Hi	Lo	Lo	○	○	○	○	○	Lo	Lo	Lo
REC mode. REC/PAUSE mode.	Lo Lo	Hi Hi	Hi Hi	Lo Hi	×	×	×	○ ○	○ ○	Lo Lo	Lo Lo	Lo Lo
Timer REC stand-by mode.	Hi	Lo	Lo	Lo	○	○	×	×	×	Lo	Hi	Lo
Timer recording start.	Hi	Hi	Hi	Lo	×	×	×	○	×	Hi	Lo	
During timer-recording.	Hi	Hi	Hi	Lo	×	×	×	×	×	Hi	Lo	Lo
Timer-recording finish (Program stand-by.)	Hi	Lo	Lo	Lo	○	○	×	×	×	Lo	Hi	Lo





REGULATOR P.C.B

POWER TR P.C.B



AUX BATT. CHARGE JACK P.C.B

Q901	Q902	Q903	Q904
B 14.0(15.2-19.2)	B 0(0.7)	B 8.0	B 0.2
C 21.5	C 8.0(0.1)	C 14.1	C 14.1
E 12.8(14-18)	E 0	E 7.4	E 0

IC902						
7	6	5	4	3	2	1
5.9 (5.9)	0.1 (6.6)	0 (1.8)	0 (0)	5.9 (5.9)	0.1 (6.6)	3.0 (3.0)

IC901			
4	0	5	11.6
3	12.7	6	12.5
2	12.5	7	1.2
1	20.3	8	21.6

Q905	Q906	Q907	Q908	Q909	Q910	Q911	Q912	Q913
B 11.7	B 11.7	B 0.7	B 0	B 0	B 0.7	B 0(0.7)	B 0	B 0(0.7)
C 10.4	C 12.8	C 0.1	C 0.7	C 16.5	C 0	C 10.9 (0.1)	C 0.7 (7.2)	C 0(0)
E 12.5	E 12.5	E 0	E 0	E 0	E 0	E 0(0)	E 0	E 0(0)

Q914	Q915	Q916	Q917	Q918
B 0(0) (0.8)	B 0.7(0.7) (0.1)	B -0.2	B 0.7	B 0
C 2.0(19.7) (0.1)	C 0(0) (14.6)	C 0.7	C 0	C 0.2
E 0(0X0)	E 0(0X0)	E 0	E 0	E 0

* VOLTAGES OF EACH MODE ARE SHOWN AS FOLLOWS
 (0.6)-ADAPTER MODE
 (0.6)-VTR INT. BATTERY CHARGING MODE
 (1.3)-AUX. BATTERY CHARGING MODE

PG901	
1	18V/12V
2	18V
3	18V/12V

From POWER TR CN901	
1	40V
2	18V
3	GND
4	TUNER 12V

From RECTIFIER

PG902	
1	GND
2	TIMER SET
3	TIME ON
4	TIME ON
5	18V
6	18V / 12V
7	CHARLITE INDI
8	TIMER INDI

From INPUT KEY CN151

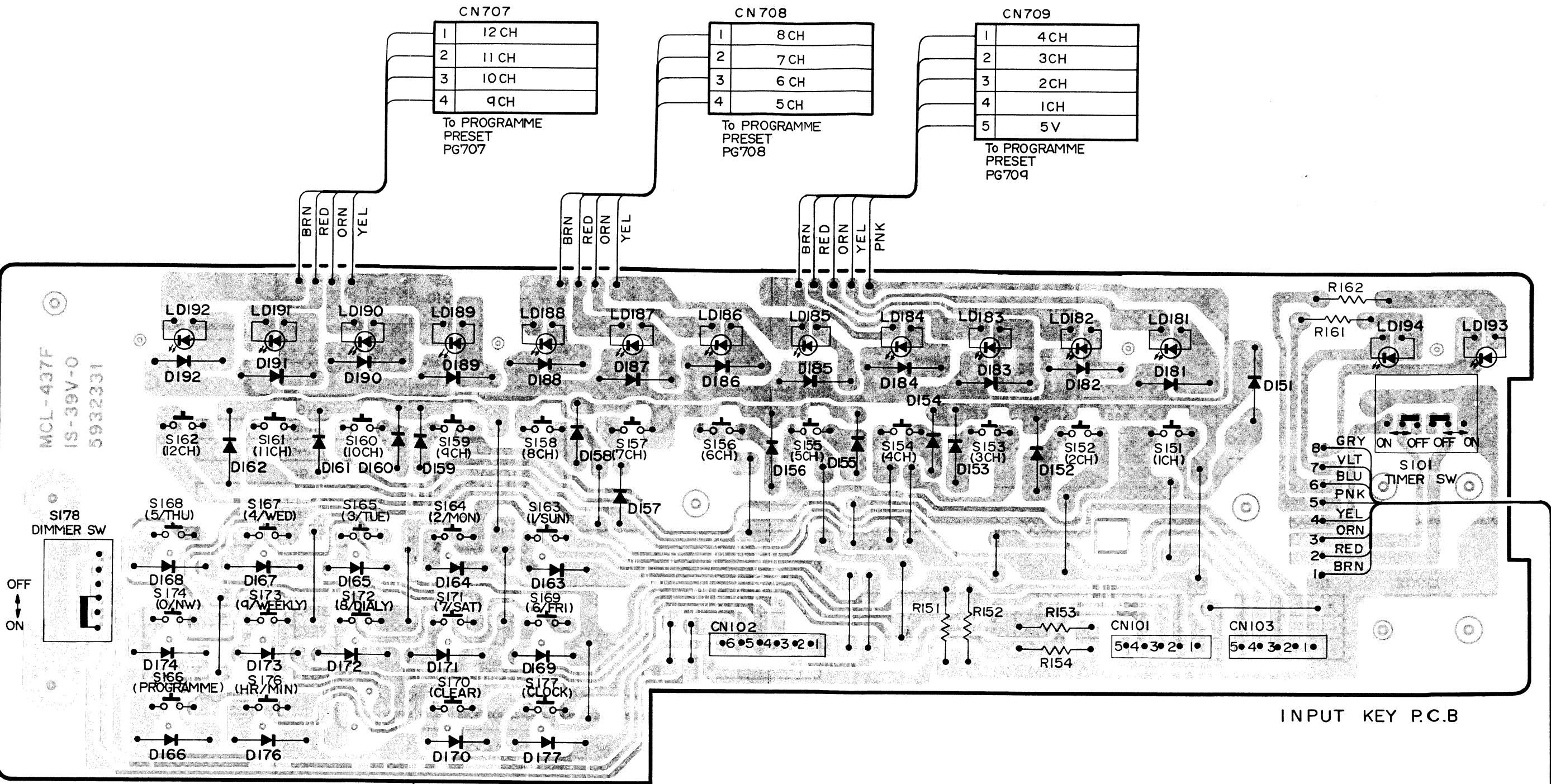
PG904	
1	TIME ON
2	PB HI
3	18V/12V
4	VTR ON
5	GND

From TUNER CONNECTOR CN972

PG905	
1	18V/12V
2	GND
3	START
4	CHARGE INDI

From AUX BATT CHARGE JACK CN905

Except for the UK model



CN101	
1	MAT. 1
2	MAT. 2
3	MAT. 3
4	MAT. 4
5	GND

To
TIMER
PG101

CN102	
1	G 4
2	G 3
3	G 2
4	G 1
5	DIM. 1
6	DIM. 2

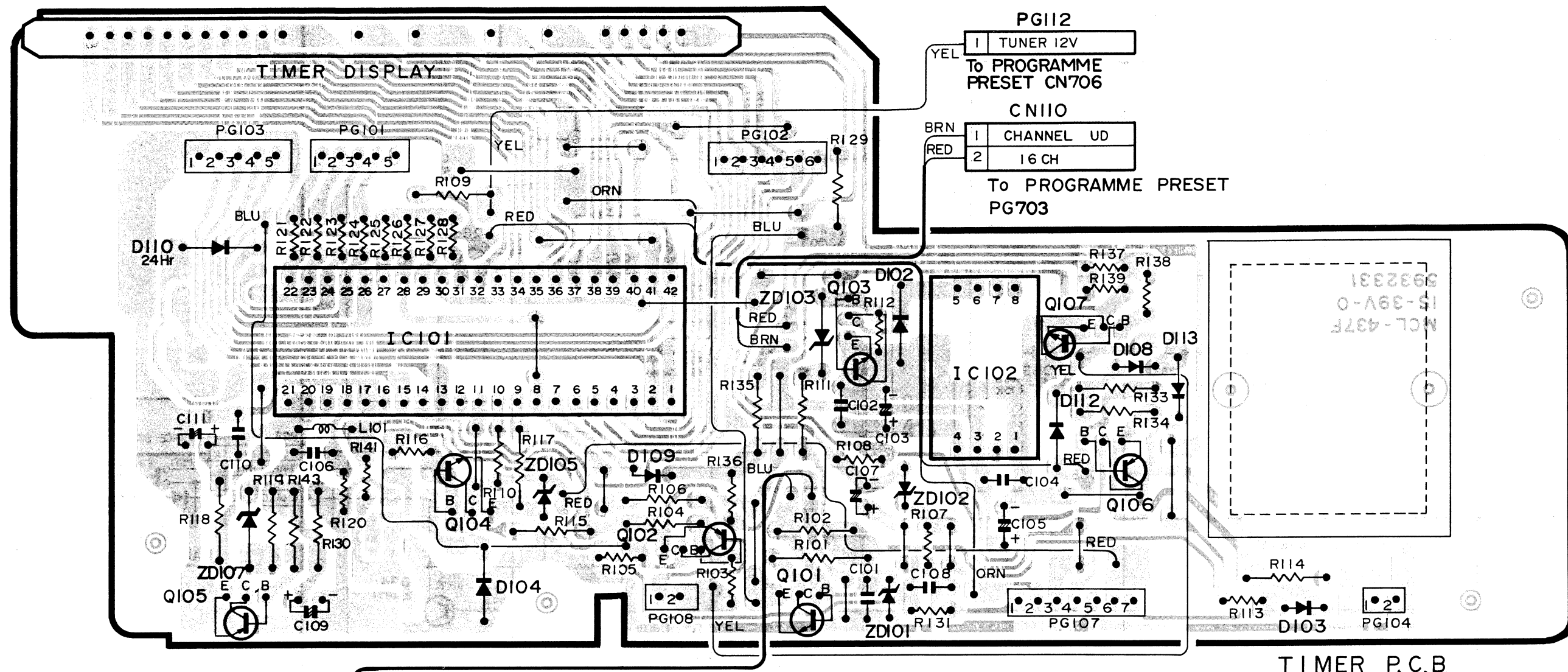
To
TIMER
PG102

CN103	
1	GND
2	G 5
3	G 6
4	G 7
5	G 8

To
TIMER
PG103

CN151		
1	GND	BRN
2	TIMER SET	RED
3	TIME ON	ORN
4	TIME ON	YEL
5	18V	PNK
6	18V/12V	BLU
7	CHAGE INDI	VLT
8	TIMER INDI	GRY

From
REGULATOR



Q101

B	11.9
C	21.0
E	10.5

Q102

B	10.5 (9.9)
C	0 (10.5)
E	10.5

Q103

B	0.7
C	0
E	0

Q104

B	—
C	4.7
E	0

Q105

B	10.5
C	0
E	10.5

Q106

B	—
C	2.7
E	2.7

Q107

B	0.6
C	0
E	0

CN113

1	RESET
2	GND

To
PROGRAMME PRESET
PG704

IC101

22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
0	0	0	0	0(10.5)	9.2	-2.2	0	0	0	—	—	—	—	—	—	—	—	—	—	—
21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
10.5	10.5	—	7.4	0	0	0	-22.4	-22.0	—	4.7	8.4	0	-2.2	10.2	—	—	—	—	—	—

IC102

5	6	7	8
0	—	—	—
4	3	2	1
2.7	10.5	—	0

PG101

1	MAT. 1
2	MAT. 2
3	MAT. 3
4	MAT. 4
5	—

From
INPUT KEY
CN101

PG102

1	G 4
2	G 3
3	G 2
4	G 1
5	DIM 1
6	DIM 2

From
INPUT KEY
CN102

PG103

1	GND
2	G 5
3	G 6
4	G 7
5	G 8

From
INPUT KEY
CN103

PG104

1	BATT.
2	GND

From
BACK UP
BATTERY
CN104

PG107

1	AC40V
2	AC 3V
3	- 35 V
4	18V
5	GND
6	P. FAILURE
7	AC3V

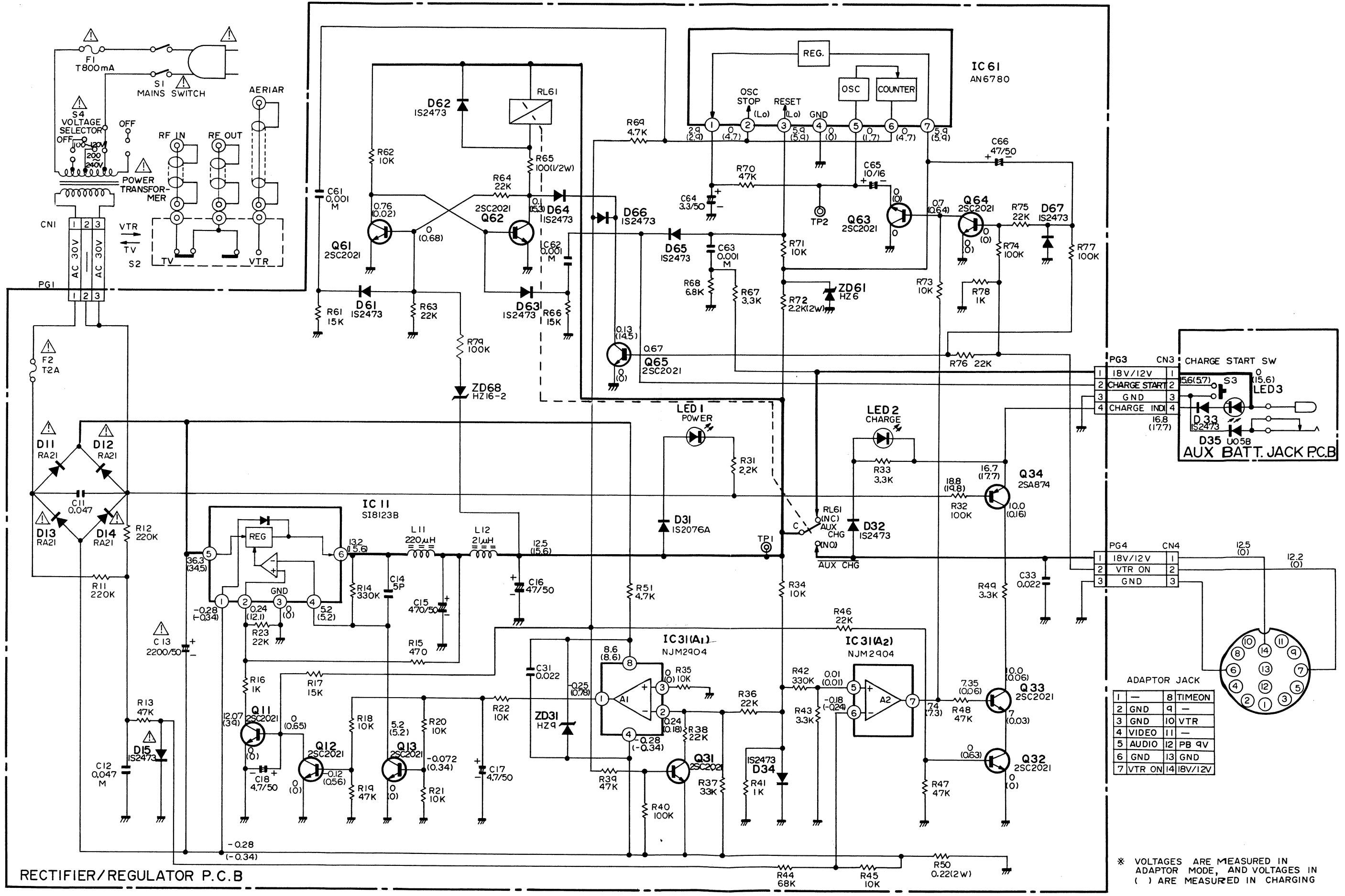
From
RECTIFIER
CN952

PG108

1	TIME ON
2	TIME SET

From
REGULATOR
CN903

A-V60E ADAPTOR



PG 1

1	AC 30V
2	
3	AC 30V

From
POWER TRANCE
CN 1

PG 3

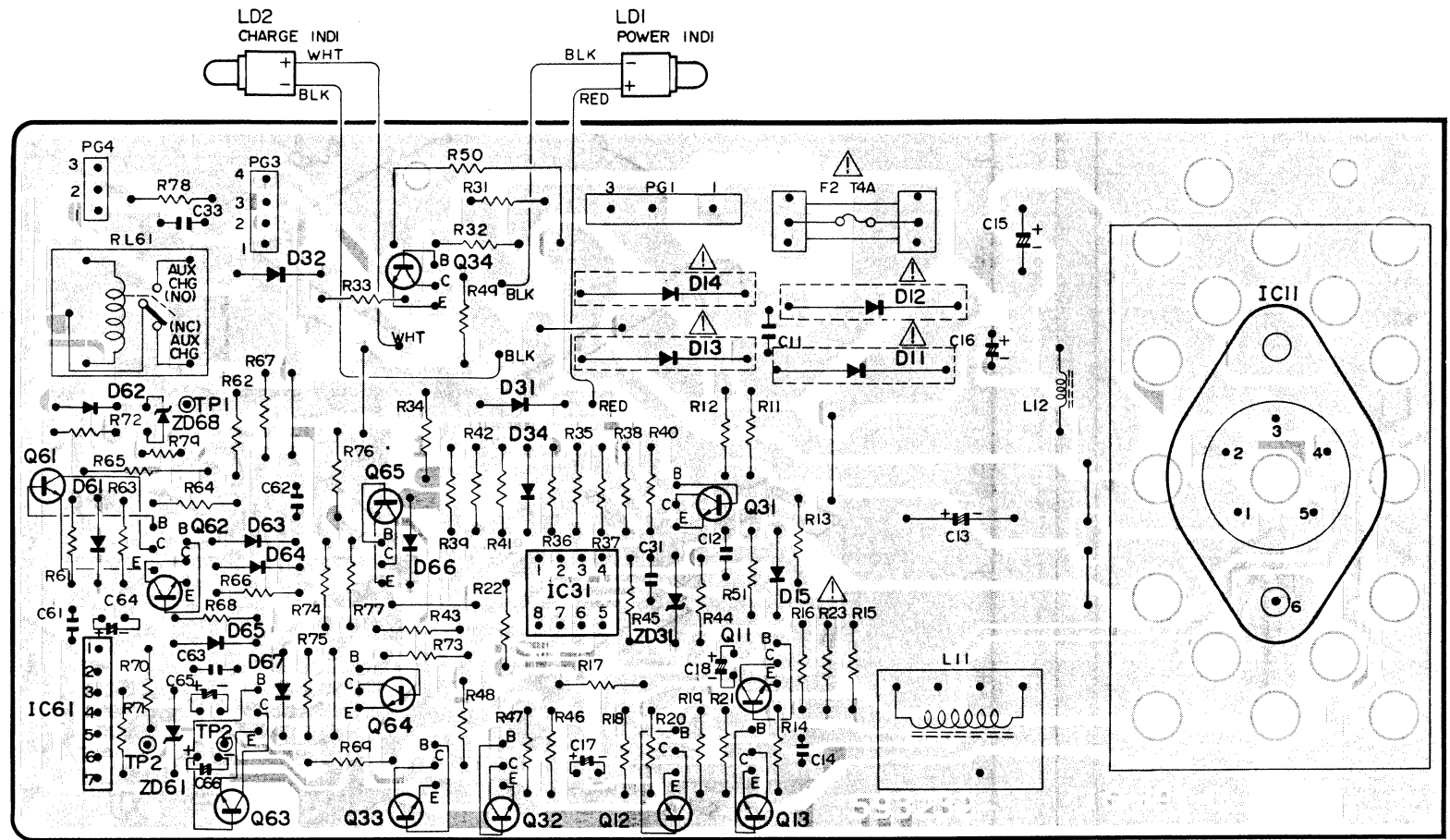
1	18V/12V
2	CHARGE START
3	GND
4	CHARGE INDI

From
AUX BATT. JACK
CN 3

PG 4

1	18V/12V
2	VTR ON
3	GND

From
ADAPTER JACK
CN 4



RECTIFIER/REGULATOR P.C.B

IC 61						
1	2	3	4	5	6	7
2.4 (2.4)	0 (4.7)	5.4 (5.4)	0 (0)	0 (1.7)	0 (4.7)	5.4 (5.4)

Q 11			
B	0 (0.65)		
C	12.07 (3.4)		
E	0 (0)		

Q 12			
B	-0.12 (0.56)		
C	0 (0.65)		
E	0 (0)		

Q 13			
B	-0.072 (0.34)		
C	3.2 (5.2)		
E	0 (0)		

IC 31			
1	2	3	4
-0.25 (0.78)	0.24 (0.18)	0 (0)	0 (0)
8 (8.6)	7 (7.3)	6 (0.24)	5 (0.01)

IC 11			
1	2	3	4
-0.28 (0.34)	0.24 (0.21)	0 (0)	-0.28 (0.34)
5 (36.3)	6 (13.2)		

Q 32			
B	0 (0.63)		
C	7 (0.03)		
E	0 (0)		

Q 33			
B	7.35 (0.66)		
C	10.0 (0.06)		
E	0 (0.03)		

Q 34			
B	18.8 (19.8)		
C	10.0 (0.16)		
E	16.7 (1.77)		

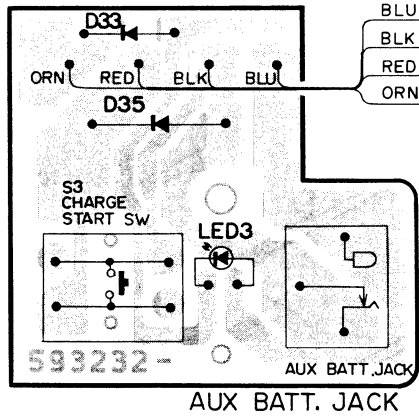
Q 61			
B	0 (0.68)		
C	0.76 (0.02)		
E	0 (0)		

Q 62			
B	0.02 (0.76)		
C	0.1 (15.3)		
E	0 (0)		

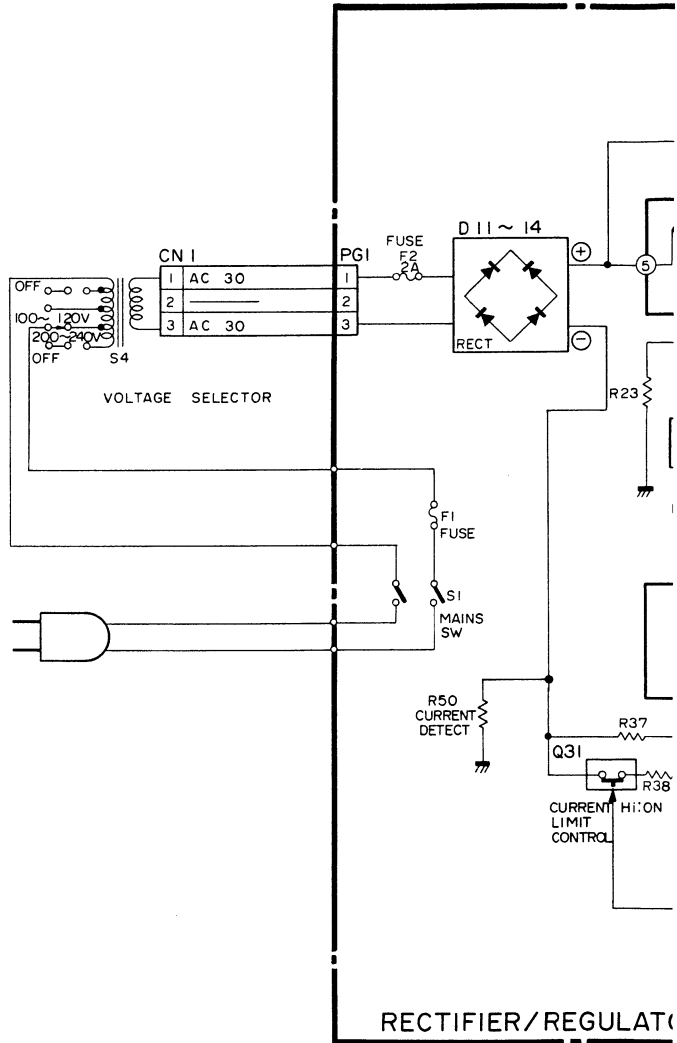
Q 63			
B	0.7 (0.64)		
C	0 (0)		
E	0 (0)		

Q 64			
B	0 (0)		
C	0.7 (0.64)		
E	0 (0)		

Q 65			
B	0.67 (14.5)		
C	0.13 (14.5)		
E	0 (0)		



AUX BATT. JACK



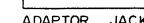
RECTIFIER/REGULATOR



Diagram showing the connection of the BLU, BLK, RED, and ORN wires to the D35 connector. The BLU wire is connected to the BLU pin, the BLK wire to the BLK pin, the RED wire to the RED pin, and the ORN wire to the ORN pin. The D35 connector is labeled with the pin numbers 1, 2, 3, and 4.

Wire Color	Pin	Function
BLU	1	18V / 12V
BLK	2	CHARGE START
RED	3	GND
ORN	4	CHARGE INDI

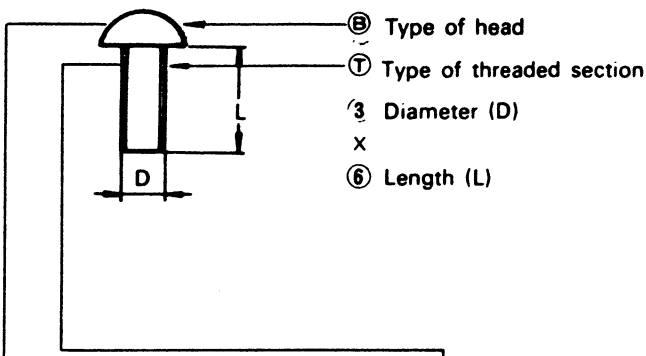
AUX BATT. JACK



EXPLODED VIEWS

SCREW CLASSIFICATION

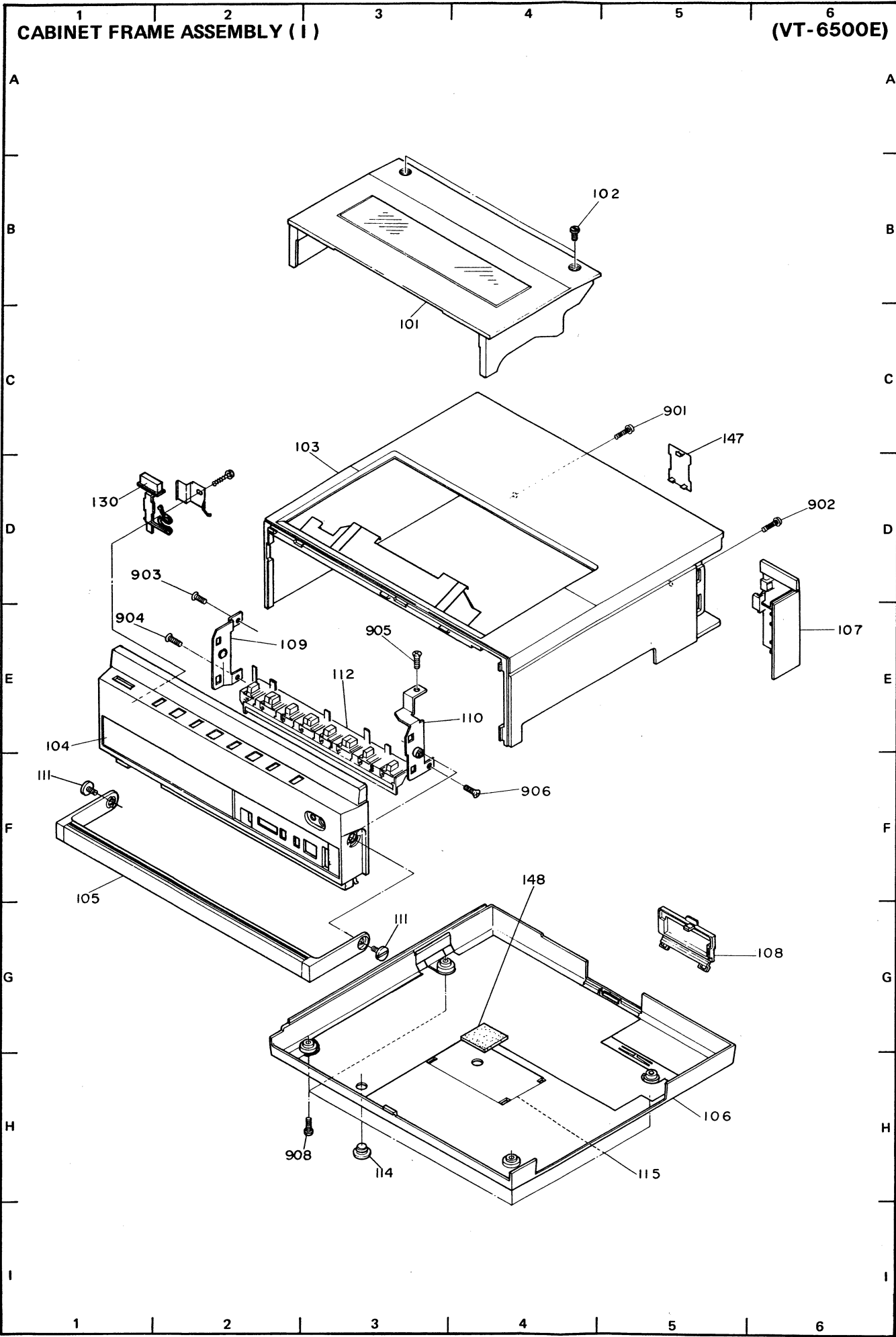
Example: BT3 x 6

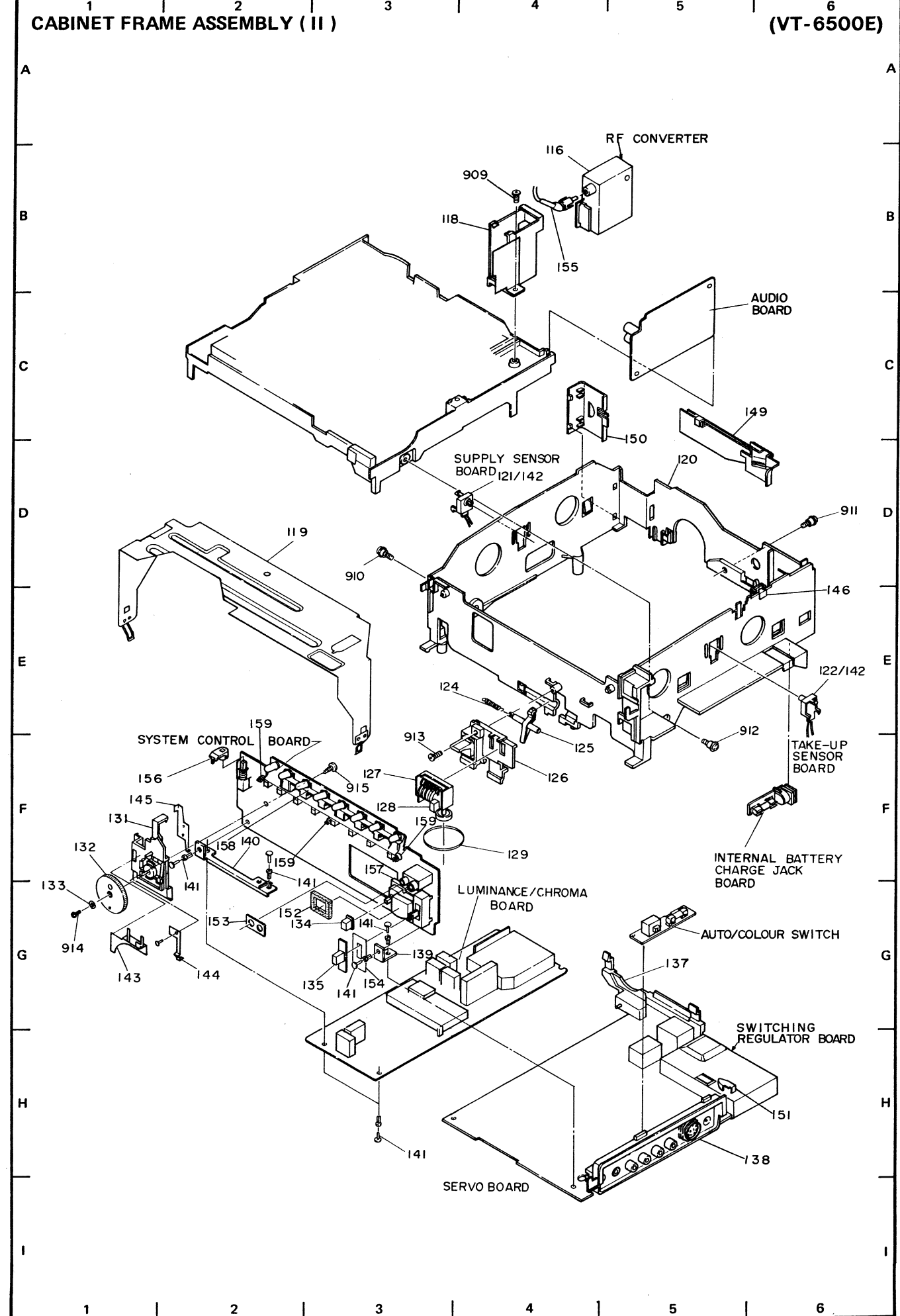
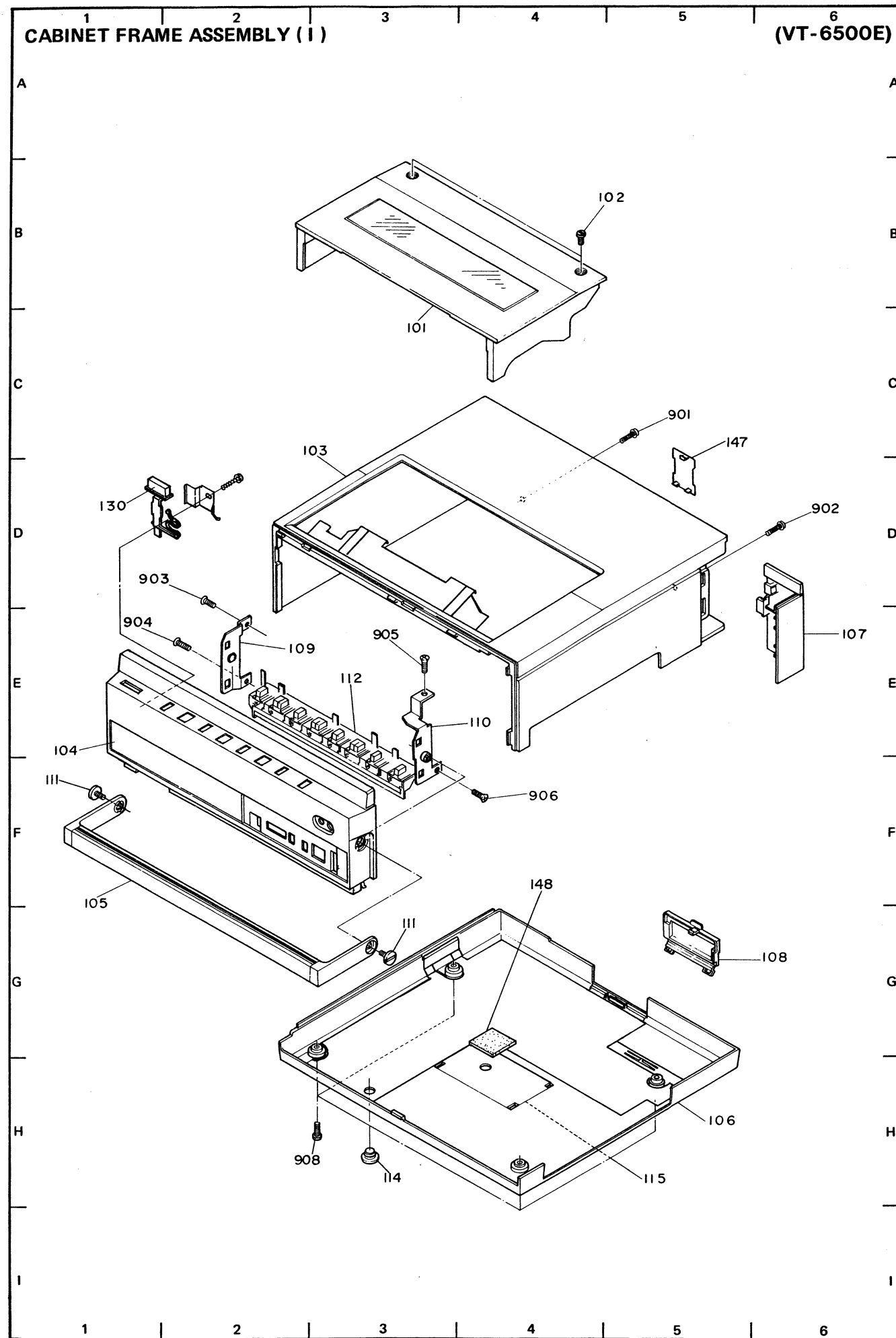


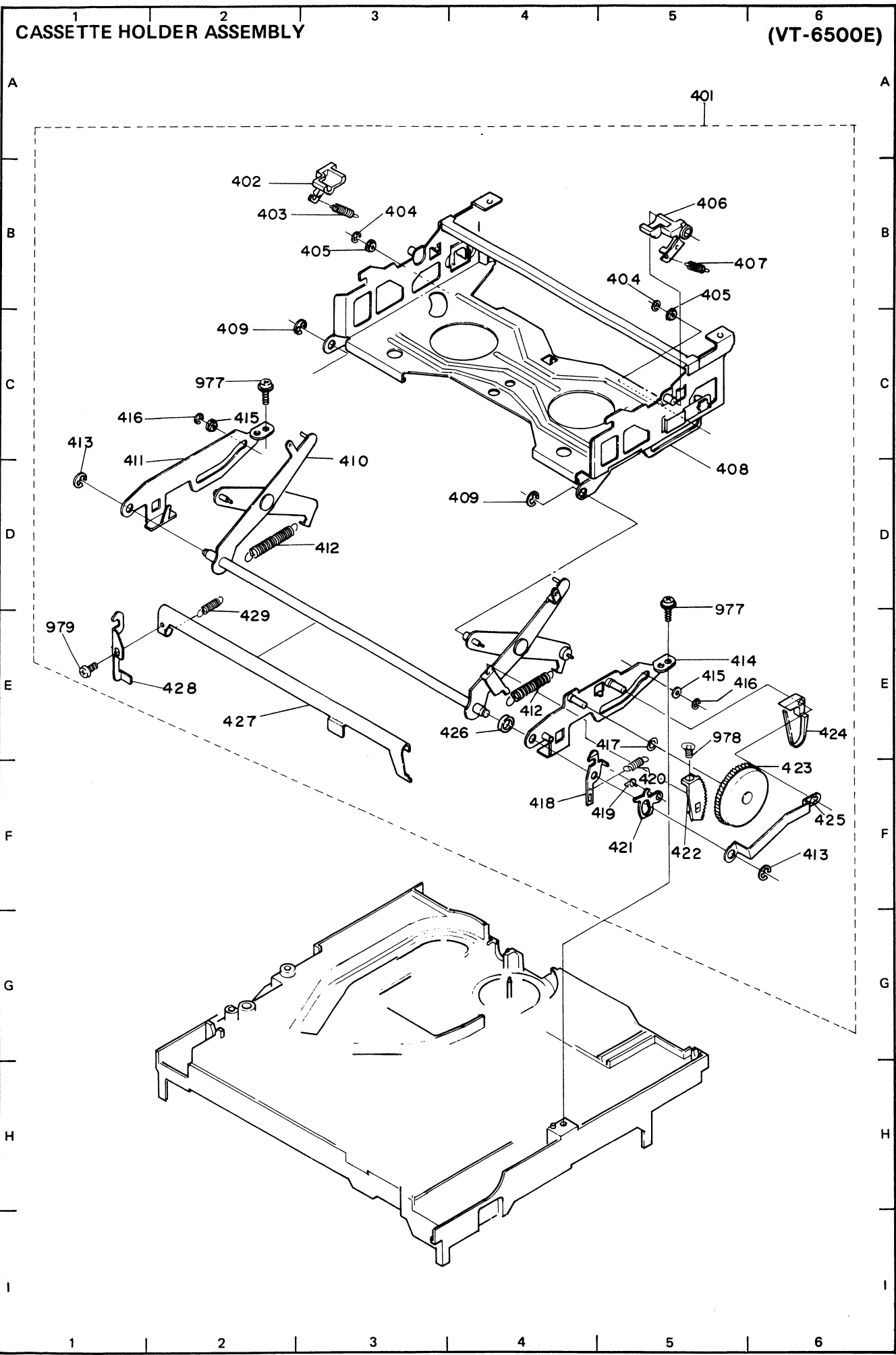
Abbreviation	Name	Shape
No symbol	Brazier head	
P	Pan head	
B	Binding head	
O	Oval countersunk head	
F	Flat countersunk head	

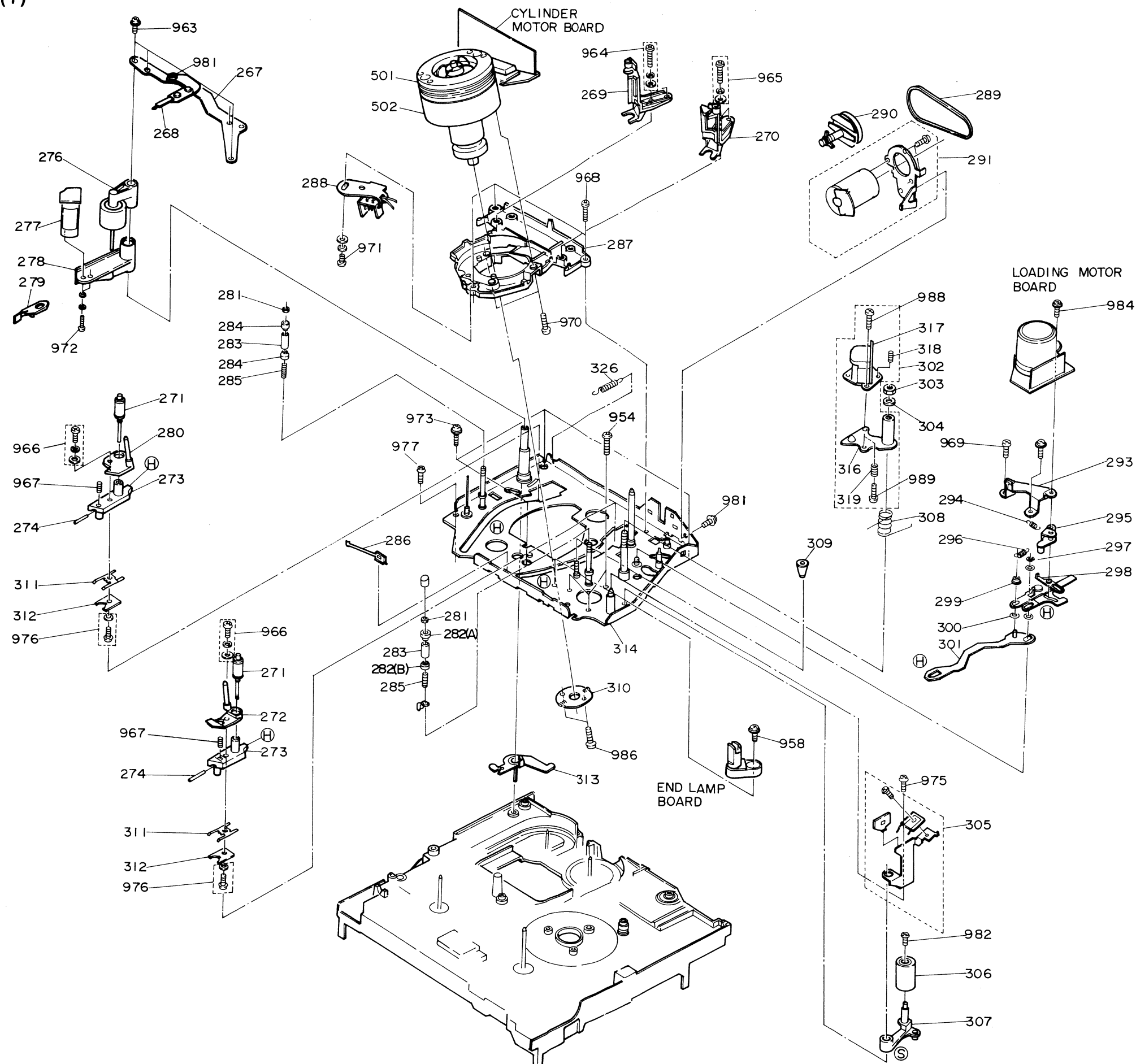
Abbreviation	Name	Shape
No symbol	Machine (clamps without tapping)	
t	Tapping (clamps with tapping) Type 1	
T	Tapping (clamps with tapping) Type 2	
f	Forming tight (for metal)	
Note: Since the forming tight screw tightens while self-tapping, machine screws can be replaced by tapping screws.		

Washers and Nuts		
Abbreviation	Name	Shape
W	Washer	
SW	Spring washer	
LW	Locking washer	
E	E-ring	
N	Nut	
Note: Internal dia. is indicated for nuts and washers		









MECHANICAL PARTS LOCATION (1)

(VT-6500E)

A

A

B

B

C

C

D

D

E

E

F

F

G

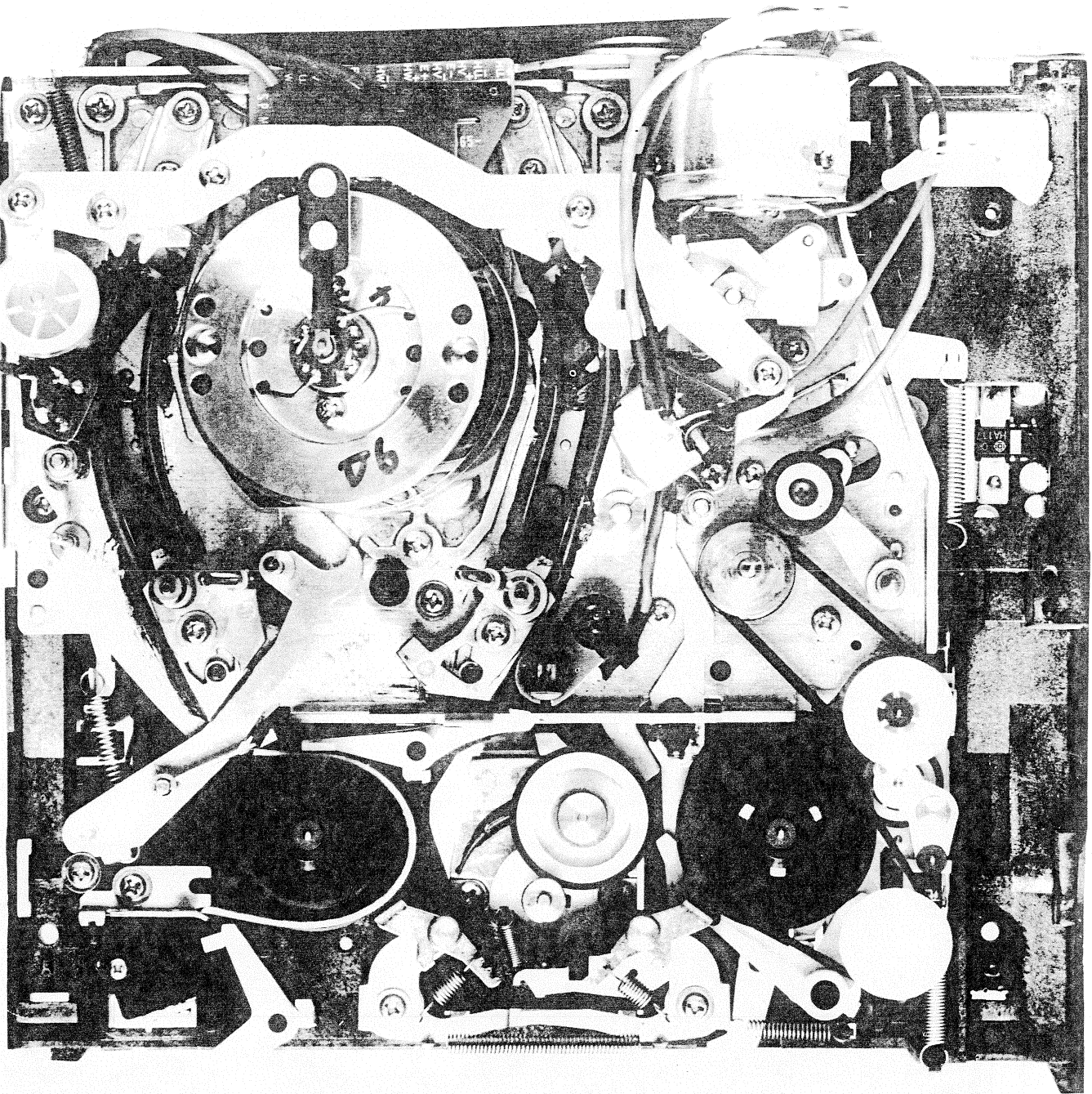
G

H

H

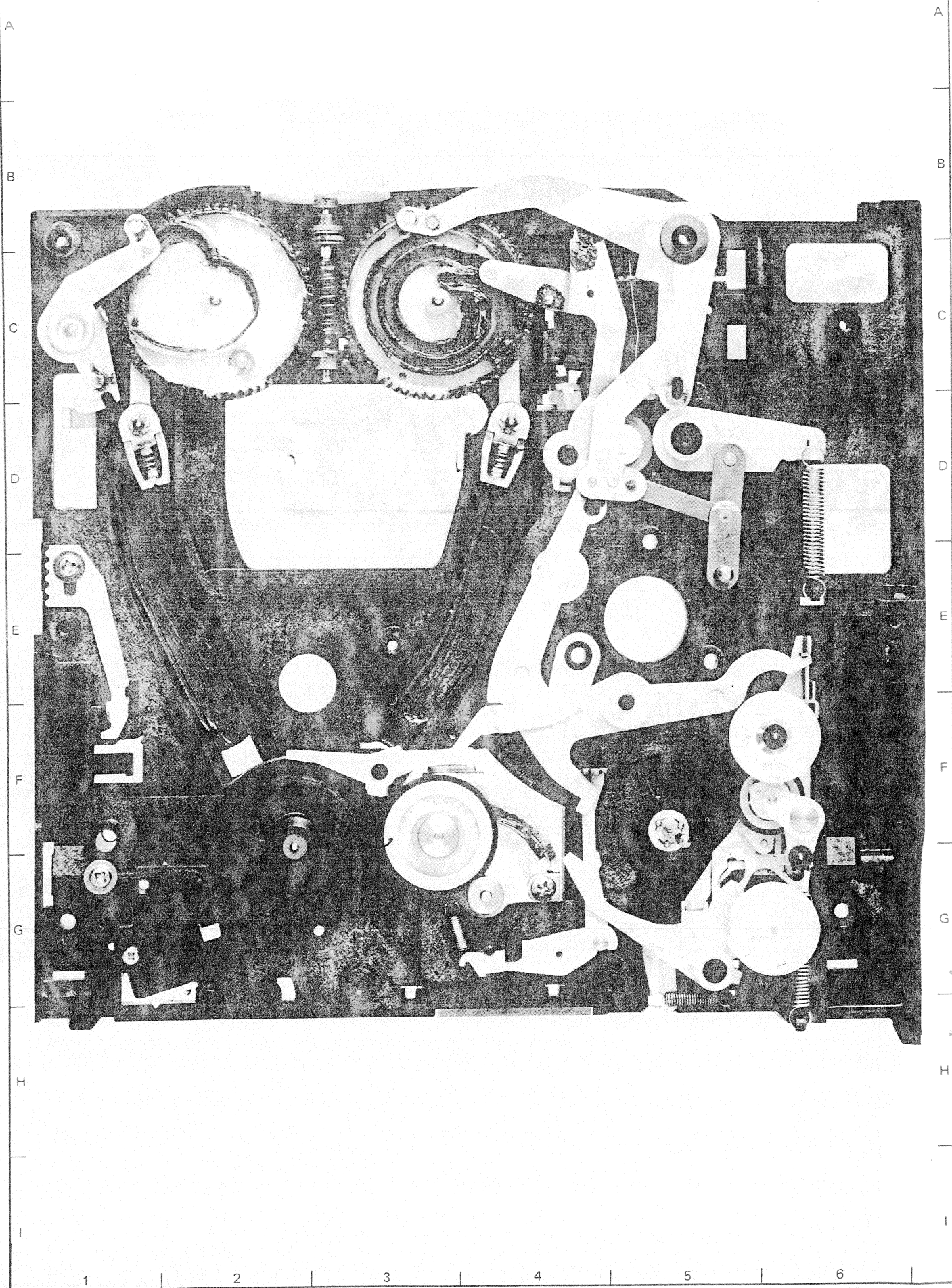
I

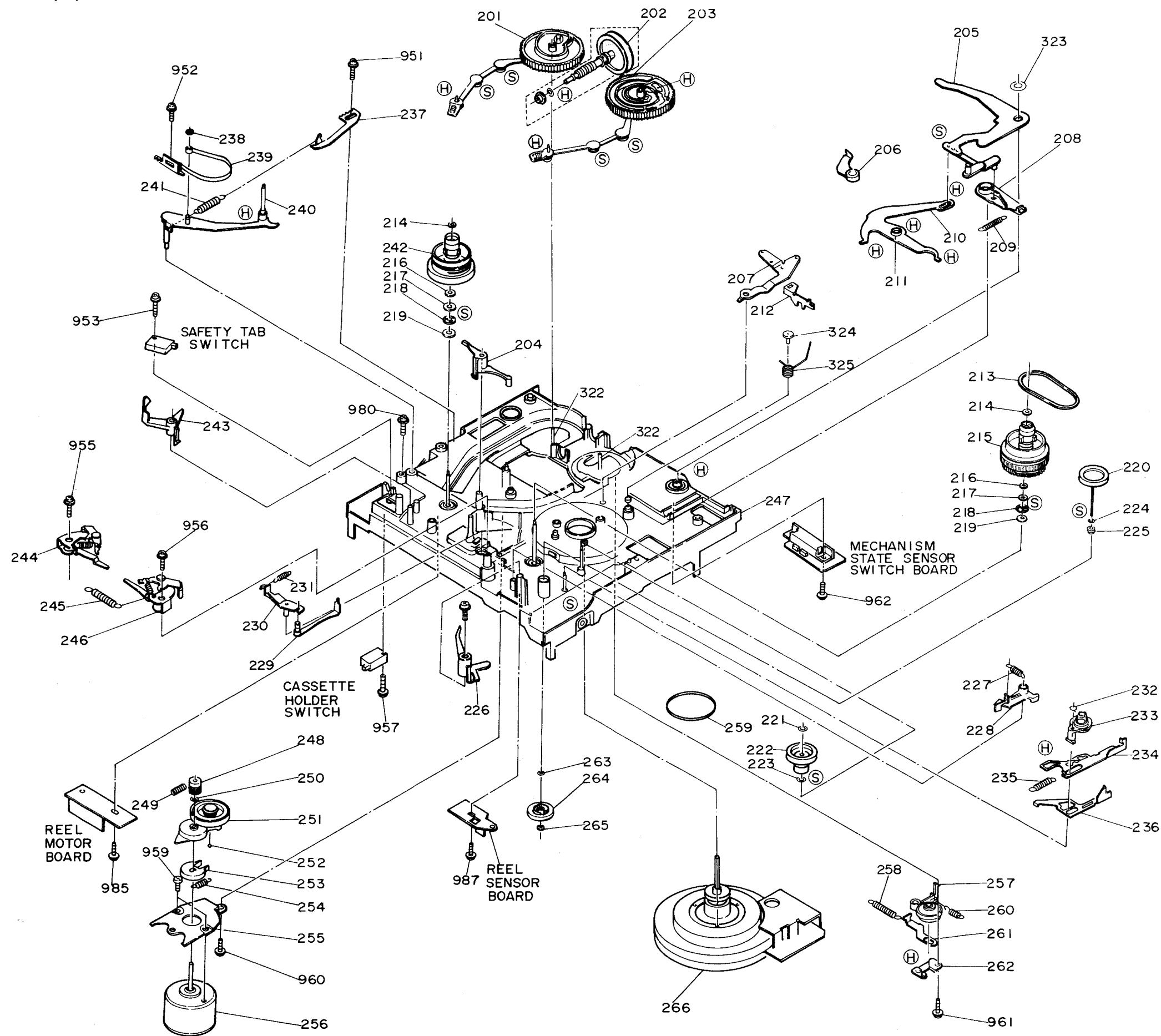
I



MECHANICAL PARTS LOCATION (II)

(VT-6500E)





VT-6500E

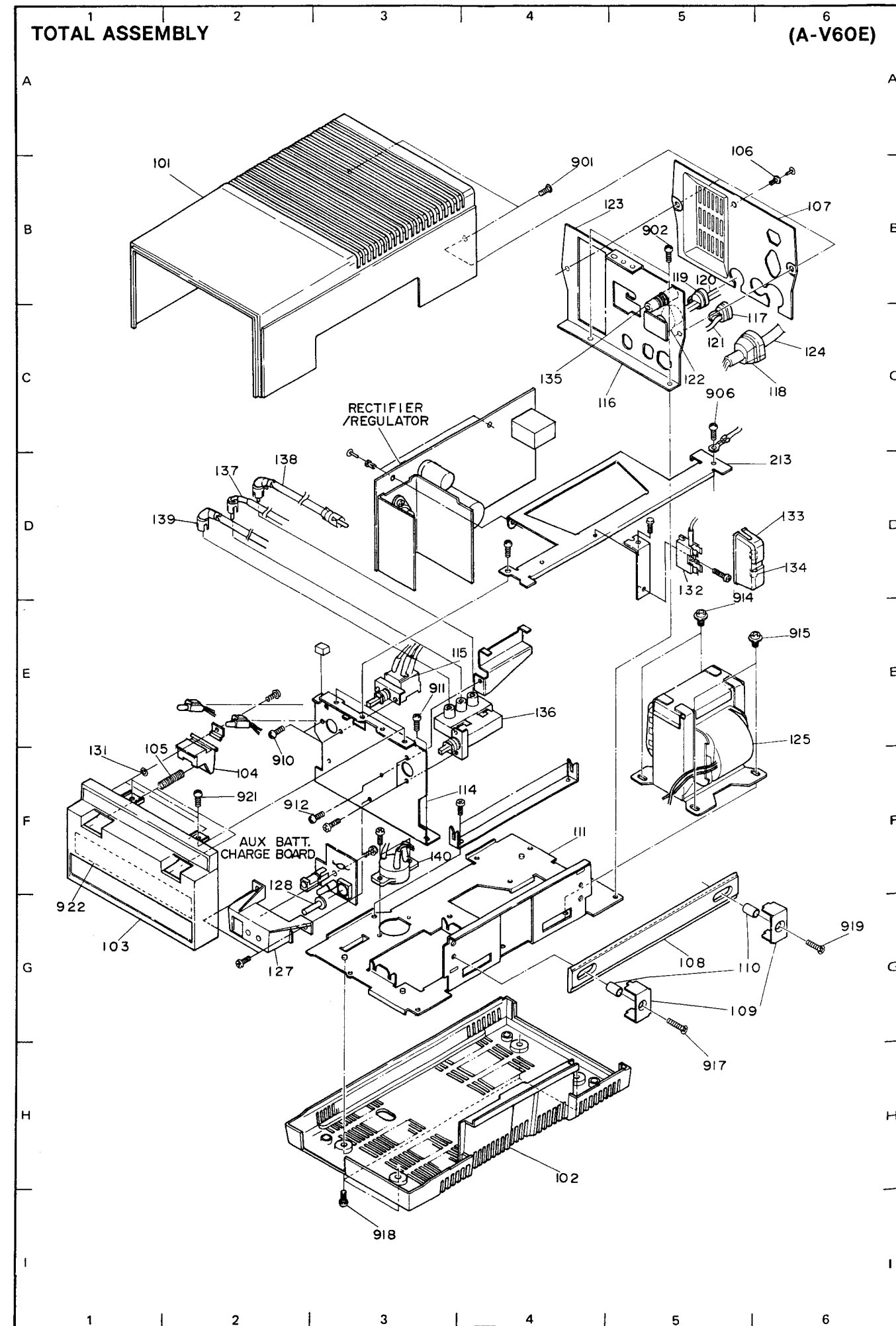
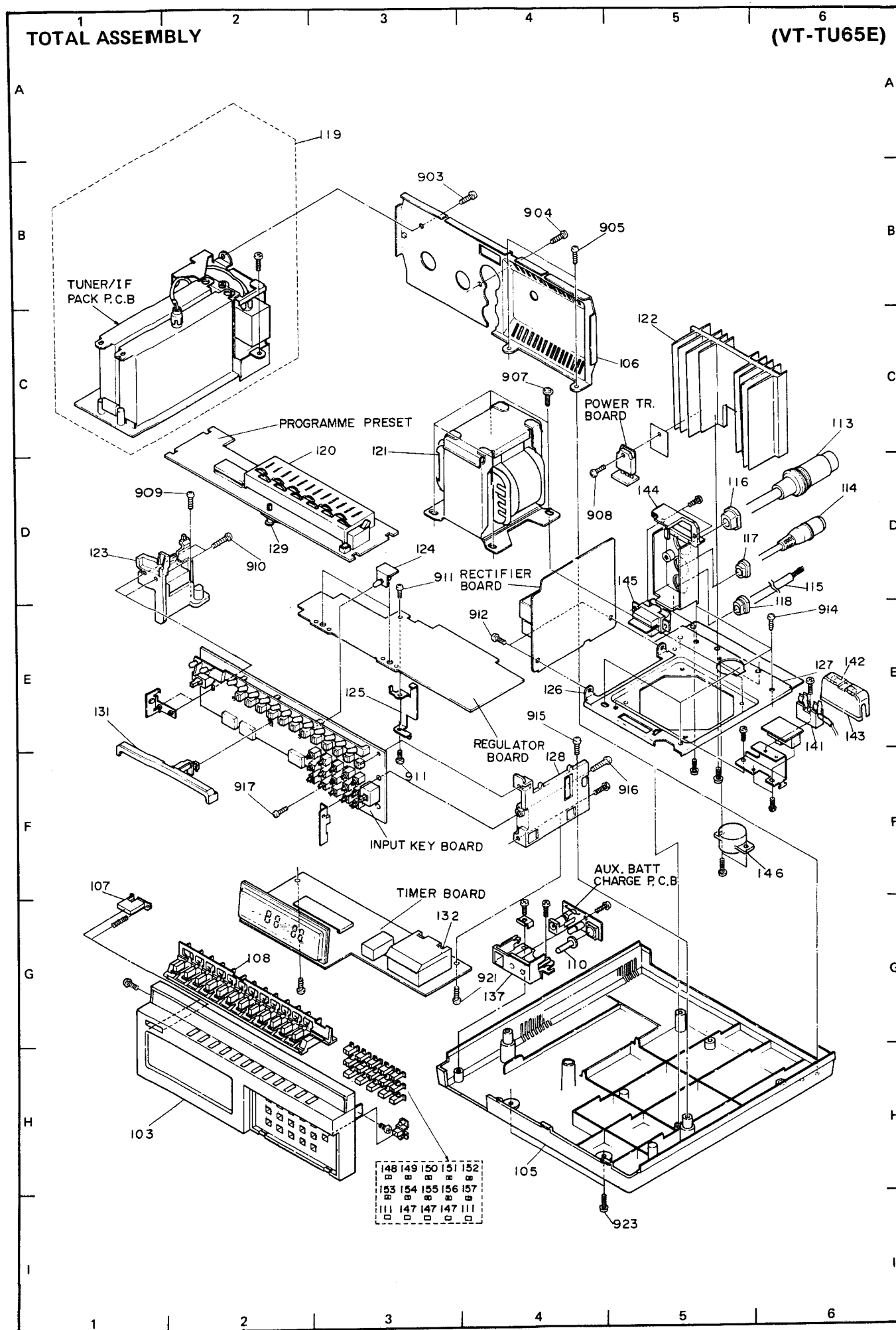
REPLACEMENT PARTS LIST

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
CAPACITORS					
C268	5058391	TRIMMER	D709	5330501	DIODE SILICON UO-5B 60HZ 3MW
C621	0239325	CYLINDRICAL CERAMIC 10000PF	D710-711	5330573	DIODE 1S2473
RESISTORS			D801	5330326	DIODE HZ9B3
B801	5068311	RESISTOR BLOCK	D802	5330312	DIODE-ZENER SILICON
B802	5068291	TRIMMER	D803	5330713	DIODE HZ-3B
B803	5060043	CR PACK	D804-805	5331511	DIODE DAN201
RT401,403	5007464	SEMI VARIABLE 47KOHM	D806,817,	5331592	DIODE 1S8133
RT402	5007465	SEMI VARIABLE 100KOHM	D807-808,	5330573	DIODE 1S2473
RT404	5007466	SEMI VARIABLE 220KOHM	D809-816	5380491	LED LN-81P
RT501-502	5007438	SEMI VARIABLE 100KOHM	D818,823	5330573	DIODE 1S2473
RT503,505	5007452	SEMI VARIABLE 220KOHM	D819-822	5331592	DIODE 1S8133
RT504,509	5007449	SEMI VARIABLE 47KOHM	D824-826	5331592	DIODE 1S8133
RT506	5007451	SEMI VARIABLE 100KOHM	D829	5331613	DIODE 1S34A
RT507	5007491	SEMI VARIABLE 470KOHM	D830-833	5330552	ZENNER DIODE HZ11B
RT508,512	5007438	SEMI VARIABLE 100KOHM	D901	5330573	DIODE 1S2473
RT510	5007447	SEMI VARIABLE 10KOHM	D902	5330104	RECTIFIER SILICON V06A 15K
RT511	5007434	SEMI VARIABLE 4.7KOHM	D903-904	5331511	DIODE DAN201
RT801	5007445	SEMI VARIABLE 2.2KOHM	IC201	5375601	MODULE HT4217
R230-231	0170472	FUSE RESISTOR 3.3OHM+-5% 1/4W	IC202	5375611	MODULE HT4218
R233	5007433	SEMI VARIABLE 2.2KOHM	IC203	5375621	MODULE HT4219
R280	5007318	SEMI VARIABLE 20KOHM	IC204	5375641	IC TA4327
R297,235	5007432	SEMI VARIABLE 1.0KOHM	IC205	5358681	IC TA4301
R420	0170481	FUSE RESISTOR 220HM+-5% 1/4W	IC206	5375581	IC TA4326
R422	0170474	FUSE RESISTOR 10 OHM+-5% 1/4W	IC401	5352631	IC BA5102
R650	5008711	VARIABLE RESISTOR	IC402	5375661	IC TA4329
R841	0170419	CARBON FILM 220HM+-5% 1/4W	IC501	5352621	IC HA11727
SEMI-CONDUCTORS			IC502	5352611	IC BA847
803,804	5321662	TRANSISTOR 2SC2021S	IC503	5350251	IC HA1406
814,	5321662	TRANSISTOR 2SC2021S	IC504-505	5359501	IC MPD4011C
D201,207	5330573	DIODE 1S2473	IC681	5352111	IC HA11714
D202,206	5330571	DIODE 1S2473VE	IC682	5352121	IC HA11715
D204,205	5330573	DIODE 1S2473	IC701	5358752	IC TA4308A
D208,209	5330573	DIODE 1S2473	IC702	5375651	IC TA4328
D401-404	5330131	DIODE 1S2076	IC801	5365621	IC HD44820A17
D405-406	5330133	DIODE SILICON 1S2076 100MHZ 250MW	IC802	5358872	IC TA4316A
D501-513	5330573	DIODE 1S2473	IC803	5358782	IC TA4312A
D514	5330552	ZENNER DIODE HZ11B	IC805	5358161	IC TA4168
D515-521	5330573	DIODE 1S2473	IC806	5365672	IC MB4204
D523-524	5330573	DIODE 1S2473	IC807	5359501	IC MPD4011C
D525-527	5331502	DIODE 1K34ALF	IC808	5365661	IC MPD4555
D528-536	5330573	DIODE 1S2473	IC809	5365481	IC MPD4049C
D539-556	5330573	DIODE 1S2473	IC810	5358792	IC TA4313A
D557	5331502	DIODE 1K34ALF	IC901	5358861	IC TA4310
D601-609	5331511	DIODE DAN201	IC902	5358762	IC TA4309A
D702	5331511	DIODE DAN201	IC903	5391041	IC DM101A
D704,708	5330573	DIODE 1S2473	Q201-206	5320813	TRANSISTOR 2SC945P
D705	5331431	DIODE ERB81	Q207	5321252	2SA844D
D706	5330001	RECTIFIER SILICON V03C 60H	Q210-216	5320813	TRANSISTOR 2SC945P
			Q401-403	5321661	TRANSISTOR 2SC2021R
			Q501,510	5321502	TRANSISTOR 2SK68-M

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
Q502-509	5321661	TRANSISTOR 2SC2021R		6755481	IC HOLDER
Q511,513	5322993	TRANSISTOR 2SA937QR		6757061	LED HOLDER (1)
Q512,515	5321661	TRANSISTOR 2SC2021R		6861311	LED HOLDER
Q514	5322873	TRANSISTOR 2SC1652QR		686207J	FUSE HOLDER
Q516,518	5322993	TRANSISTOR 2SA937QR	CP201	5123833	COIL
Q517,519	5321661	TRANSISTOR 2SC2021R	CP202	5161952	LOW PASS FILTER
Q520	5321661	TRANSISTOR 2SC2021R	CP203	5161954	HIGH PASS FILTER
Q521	5322993	TRANSISTOR 2SA937QR	CP204	5162113	LOW PASS FILTER
Q522-529	5321661	TRANSISTOR 2SC2021R	CP205	5162111	DELAY LINE
Q702,704	5321661	TRANSISTOR 2SC2021R	CP206	5161971	LOW PASS FILTER
Q705	5321661	TRANSISTOR 2SC2021R	CP207	5161974	BAND PASS FILTER
Q707-708	5320593	TRANSISTOR 2SA673C	CP208	5161973	BAND PASS FILTER
Q709	5321294	TRANSISTOR 2SC 1740S	DL201	5785191	DELAY LINE
Q710	5321252	2SA844D	DL202	5785122	DELAY LINE
Q710-712	5321661	TRANSISTOR 2SC2021R	F701	5721065	FUSE 3.15A
Q801,815,	5321662	TRANSISTOR 2SC2021S	F703	5721062	FUSE 4A 250V
Q805-813	5322993	TRANSISTOR 2SA937QR	J801	5679761	JACK
Q901-902	5321662	TRANSISTOR 2SC2021S	RL401-403	5641204	RELAY
Q903	5321663	TRANSISTOR 2SC2021R/S	RL701	5641402	RELAY
TRANSFORMERS			S801	5633317	SWITCH
	5270511	SWITCHING REGULATOR	S802	5633621	PUSH SWITCH
T401	5260222	OSC. TRANSFORMER	S803-809	5633671	PUSH SWITCH
COILS			S810	5624272	SWITCH
L201,206	5152337	CHOKE COIL 100UH+-10%	S811	5633671	PUSH SWITCH
L202	5152339	CHOKE COIL 150UH+-10%	X201	5780534	CRYSTAL 4.435572MHZ
L203,212	5152324	CHOKE COIL 10UH+-10%	FOR FINAL ASSEMBLY		
L204	5152334	CHOKE COIL 56UH+-10%	O101	6093401	CASSETTE LID (C)
L205,210	5152332	CHOKE COIL 39UH+-10%	O102	7547741	SPECIAL SCREW
L207,208	5152337	CHOKE COIL 100UH+-10%	O103	6104736	TOP CASE
L209	5152336	CHOKE COIL 82UH+-10%	O104	6224525	FRONT PANEL
L211	5152326	CHOKE COIL 15UH+-10%	O105	6334312	HANDLE
L213,217	5152337	CHOKE COIL 100UH+-10%	O106	6104866	BOTTOM CASE
L214	5152333	CHOKE COIL 47UH+-10%	O107	6174056	BATTERY COVER
L215	5152099	CHOKE COIL 820UH+-10%	O108	6861592	JACK COVER
L216	5152087	PEAKING COIL 100MICROH	O109	7373293	SIDE BRACKET(LEFT)
L218	5152337	CHOKE COIL 100UH+-10%	O110	7373303	SIDE BRACKET(RIGHT)
L401	5150361	CHOKE COIL	O111	7782055	SPECIAL SCREW
L402	5152346	CHOKE COIL 470UH+-10%	O112	6862503	BUTTON
L403	5150575	CHOKE COIL 1000UH	O114	6862052	CAP
L701	5152099	CHOKE COIL 820UH+-10%	O116	5585651	RF CONVERTER (BS)
L702	5152337	CHOKE COIL 100UH+-10%	O116	5585652	RF CONVERTER (C)
L703	5152333	CHOKE COIL 47UH+-10%	O118	6862791	HOLDER-RF CONDERTER
MISCELLANEOUS			O119	7459054	SHIELD PLATE
	5380441	LED LN55	O124	6302951	SPRING
	5553178	METER	O125	6861132	EJECT ARM
	5625061	SWITCH	O126	6861951	EJECT BUTTON ASSEMBLY
	5633362	PUSH SWITCH	O127	5559491	COUNTER
	5633362	PUSH SWITCH	O129	6355311	BELT
	6714216	NYLON RIVET	O130	6054083	BUTTON

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
0131	6862484	HOLDER-TRACKING	0223	7778859	POLE-SLIDER WASHER
0132	6861573	KNOB	0224	7778852	POLYESTER WASHER
0133	8815111	2MMD LOCK WASHER	0225	0945039	BEARING-2MM
0134	6053761	BUTTON-MEMORY	0226	6861212	FF/REW ARM
0135	6861561	KNOB-SPEED	0227	6318926	SPRING
0137	5679792	JACK PLATE	0228	6861142	EJECT INHIBITING ARM
0138	5679881	JACK PLATE	0229	7372442	BRAKE LINK
0139	6862031	HINGE	0230	6861173	BRAKE ARM
0140	6861971	HINGE	0231	6300602	SPRING
0141	6714211	NYLON RIVET - 3MMD	0232	7778859	POLYSLIDER WASHER
0142	5380471	PHOTO TRANSISTOR PN150TV	0233	6861481	PLAY IDLER ASSEMBLY
0143	6329894	SPRING (PLATE)	0234	7372143	SLIDER B
0144	6534586	EARTH SPRING A	0235	6541902	SPRING
0145	6534591	EARTH SPRING B	0236	7372131	SLIDER A
0146	6862782	GUIDE PIECE	0237	7372151	SPRING HOOK
0147	6864261	COVER-RF COV.	0238	7778395	E RING
0148	7677388	CUSHION	0239	7372521	TENSION BAND
0149	6862551	WIRE HOLDER	0240	7372411	TENSION ARM
0150	6862631	WIRE STOPPER	0241	6541752	SPRING
0151	6862541	WIRE STOPPER	0242	6414301	SUPPLY REEL TABLE ASSEMBLY
0152	7678003	SPACER	0243	6860992	RECORDING PREVENTION ARM
0153	7756951	SPACER	0244	7372421	BRAKE ARM (LEFT)
0154	7756871	SPACER	0245	6301633	SPRING
0155	5841781	CABLE WITH PLUG	0246	7372431	BRAKE ARM (RIGHT)
0156	6862452	CONNECTOR PIECE	0248	6345173	FF/REW PULLEY
0157	6861911	METER HOLDER	0249	7773089	SCREW 3MMDX4MM
0158	6862463	HOLDER-LED	0250	7786178	POLE-SLIDER WASHER
0159	6714214	NYLON RIVET	0251	6861471	FF/REW IDLER
0201	6861424	LOADING GEAR	0252	0948492	BALL - 2MMD
0202	6861393	LOADING WORM	0253	6861301	FF/REW ARM
0203	6861425	LOADING GEAR	0254	6541881	SPRING
0204	6861062	SUB BRAKE (SUPPLY)	0256	5576864	MOTOR-REEL
0205	7372541	ARM	0257	6861503	BRAKE
0206	6861181	SUB BRAKE ARM	0258	6541891	SPRING
0207	7372512	SWITCH ARM	0261	7372032	SLIDER
0208	6861091	SPRING	0262	6862331	GUIDE
0209	6301396	SPRING	0263	7778852	POLYESTER WASHER
0210	7372092	ARM	0264	6864142	MAGNET PULLEY
0211	6861121	SPACER	0265	7778859	POLYSLIDER WASHER
0212	7372002	SLIDER	0266	5576835	DD CAPSTAN MOTOR
0214	7778859	POLYSLIDER WASHER	0267	7372282	PLATE
0215	6414312	TAKE-UP REEL TABLE ASSEMBLY	0268	5791971	BRUSH
0216	7786216	POLYSLIDER WASHER	0269	6973801	CATCHER (SUPPLY)
0217	7787031	THRUST SUPPORT	0270	6973811	CATCHER (TAKE-UP)
0218	6750441	RETAINER	0271	6344252	GUIDE ROLLER SHAFT
0219	7787031	THRUST SUPPORT	0272	6977131	TILT POLE (TAKE-UP)
0220	6421904	PULLEY	0273	6977152	GUIDE ROLLER BASE
0221	7778859	POLYSLIDER WASHER	0274	7544352	LOCK SHAFT
0222	6345151	PULLEY	0276	6861441	IMPEDANCE ARM

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
0277	5448611	FULL ERASE HEAD	0406	6861001	LOCK ARM (RIGHT)
0278	6861221	HEAD ARM	0407	6540663	SPRING
0279	6861103	TENSION ARM OPERATION	0408	7372321	CASSETTE UP ASSEMBLY
0280	6977171	TILT POLE (SUPPLY)	0409	7230902	E RING
0281	8821114	3D NUT	0410	7372861	HOLDER LINK
0282 (A)	7598461	GUIDE FRANGI	0411	7371761	HOLDER BRACKET (LEFT)
0282 (B)	7550352	GUIDE FRANGI	0412	6541491	SPRING
0283	7575242	TAPE GUIDE	0413	7230902	E RING
0284	7543831	GUIDE FRANGI	0414	7372233	HOLDER BRACKET (RIGHT)
0285	6304903	SPRING	0415	6344381	ROLLER
0286	6535171	SPRING	0416	7778394	E RING 1,5MMD
0287	6977211	CYLINDER BASE	0417	7778843	WASHER
0288	5448594	HEAD	0418	7371741	LOCK ARM (RIGHT)
0289	6355282	BELT	0419	6546443	SPRING
0290	6861433	PULLEY	0420	6324432	SPRING
0291	7374771	MOTOR-LCADING	0421	7371732	SHAFT HOLDER
0293	7371932	X-OPERATING ASSEMBLY	0422	6431032	GEAR
0294	6301371	SPRING	0423	7372203	DUMPER ASSEMBLY
0295	7373511	BRAKE LEVER	0424	6860932	ARM
0296	6319001	LOCK SPRING B	0425	7373342	DUMPER HOLDER
0298	7372483	BRAKE SLIDER	0426	7779872	WASHER
0299	7571111	COLLAR	0427	7371842	SYNCHRO PLATE
0301	7372382	BRAKE SLIDER	0428	7371722	LOCK ARM (LEFT)
0303	8821117	NUT-5MMD	0429	6324432	SPRING
0304	8812117	WASHER-5MMD	0501	5458161	UPPER CYLINDER
0305	0170316	DEW SENSOR	0502	6993021	LOWER CYLINDER
0306	6383213	PRESSURE ROLLER ASSEMBLY	0903	8724406	FLAT SCREW-3MMDX6MM
0307	6977142	PRESSURE ROLLER	0904	7781582	FALT SCREW-3MMDX10MM(BLACK)
0308	6546551	SPRING	0905	8724406	FLAT SCREW-3MMDX6MM
0309	7549271	X-ADJUST SCREW	0906	7781582	FALT SCREW-3MMDX10MM(BLACK)
0310	7373391	MG PLATE	0908	8699416	SCREW(BT3X16)BLACK
0311	6329861	SPRING	0909	8691408	BIND TAPPING SCREW-3MMDX8MM (BLACK)
0312	7317942	LIMIT PLATE	0910	7782151	SCREW
0313	7372471	IMPEDANCE OPERATING ARM	0911	7782151	SCREW
0316	7372502	HEAD BASE	0912	7782151	SCREW
0317	5448601	AUDIO CONTROL HEAD	0914	7777672	PAN HEAD SCREW
0318	7586681	SCREW	0951	7781134	BINDING SCREW
0319	6304901	SPRING	0953	8691312	BT BIND SCREW-2,6MMDX12MM
0322	7551012	GEAR SHAFT	0954	8741412	SCREW (B3X12)
0324	6794371	BUSH	0955	7781134	BINDING SCREW
0325	6546852	SPRING	0956	7781134	BINDING SCREW
0326	6300742	SPRING			
0401	7372332	CASSETTE HOLDER ASSEMBLY			
0402	6861011	LOCK ARM (LEFT)			
0403	6540663	SPRING			
0404	7778394	E RING 1,5MMD			
0405	6344381	ROLLER			



A-V60E

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
SEMI-CONDUCTORS					
D 11-14	5331642	D IODE RA21	0120	5746094	POWER CORD (BS)
D 15	5330573	D IODE 1S2473	0120	5746157	POWER CORD (E)
D 31	5330131	D IODE 1S2076	0122	5675191	FM ANTENNA CONNECTOR
D 32	5330573	D IODE 1S2473	0124	5899012	14P CORD
D 33	5330573	D IODE 1S2473	0125	5212802	POWER TRANSFORMER
D 34	5330573	D IODE 1S2473	0127	6862352	JACK CASE
D 35	5330501	D IODE SILICON UO-5B 60HZ 3MW	0128	6054001	BUTTON
D 61-67	5330573	D IODE 1S2473	0131	7786216	POLYSLIDER WASHER
IC 11	5353401	I C SI-8123B	0132	5722131	1P FUSE HOLDER
IC 31	5352771	I C NJM2904	0133	6746881	FUSE COVER
IC 61	5352581	I C AN678Q	0134	5720175	FUSE 0.8A
LD 1-2	5380701	L ED GL-5PR5	0135	5661311	DIN JACK
LD 3	5380701	L ED GL-5PR5	0136	5639372	ANTENNA SWITCH
Q 11-13	5321663	T RANSISTOR 2SC2021R/S	0137	5898062	CABLE
Q 31-33	5321663	T RANSISTOR 2SC2021R/S	0138	5898064	CABLE WITH PLUG
Q 34	5322881	T RANSISTOR 2SA874P	0139	5898492	CABLE
Q 61-65	5321663	T RANSISTOR 2SC2021R/S	0140	5605051	ROTARY SWITCH (BS)
ZD 31	5330322	D IODE-ZENER SILICON TR-9S 10K	0901	8744408	BINDING SCREW 3MMDX8MM
ZD 61	5330392	Z ENER DIODE SILICON H26B 1MHZ 400MW	0917	8721416	SCREW (F3X16)
ZD 72	5330563	D IODE HZ16-3	0918	8744408	BINDING SCREW 3MMDX8MM
MISCELLANEOUS			0919	8721416	SCREW (F3X16)
	5658061	L ED SOCKET	0921	8741406	BIND SCREW - 3MMD X 6MM
	5658065	L ED SOCKET	0922	7485331	PLATE
	5722113	F USE HOLDER			
F 2	5720177	F USE 2A			
J 3	5674281	J ACK			
L 11	5152421	C HOKE COIL 220UH+-10%			
L 12	5150761	C HOKE COIL			
RL 61	5641171	R ELAY			
S 3	5633352	P USH SWITCH			
FOR FINAL ASSEMBLY					
0101	6104456	T OP CASE			
0102	6104825	B OTTOM CASE (E)			
0102	6104826	B OTTOM CASE (BS)			
0103	6224454	F RONT PANEL			
0104	6060361	B UTTON			
0105	6304614	S PRING			
0106	6795151	R IVET			
0107	7372353	R EAR PLATE			
0108	7753051	B AND			
0109	7372342	H OLCER			
0110	7575256	S PACER			
0115	5633541	P USH SWITCH			
0117	6794276	B USHING			
0118	6794011	B USHING			
0119	6794091	B USHING			



HITACHI

WARTUNGSANLEITUNG

TK

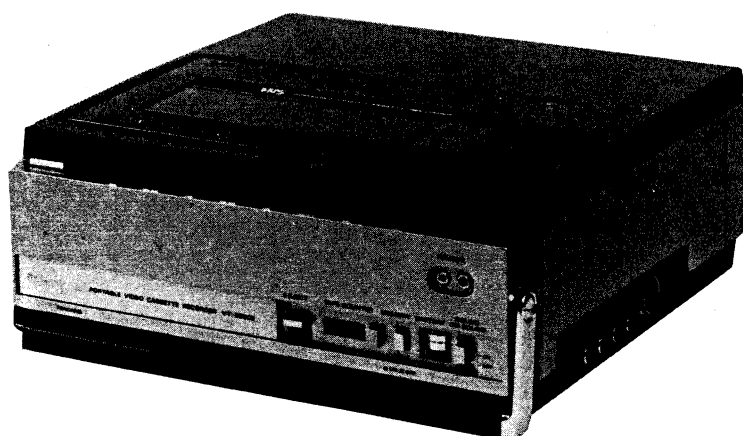
Nr. 1588G

VT-6500E

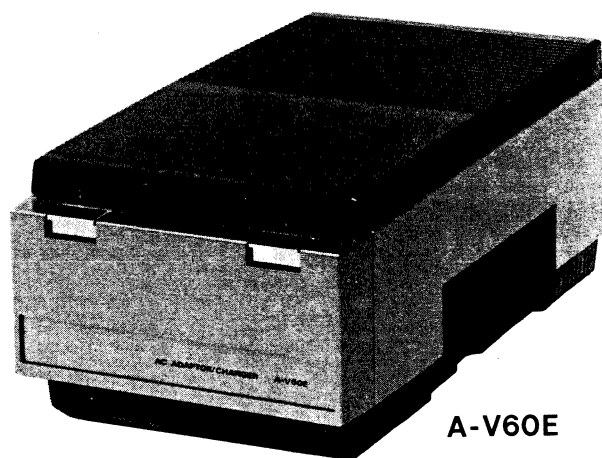
VT-TU65E

A-V60E

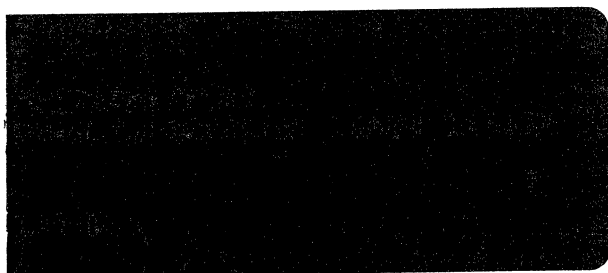
Einstellungen



VT-6500E



A-V60E



VHS

Dieses Video-Deck ist ein Video-Cassetten-Recorder des VHS-Formats. Für richtigen Betrieb dürfen nur VHS-Video-Cassetten verwendet werden.



VT-TU65E

Änderungen der Technischen Daten und des Designs vorbehalten.

Tragbarer Video-Recorder/Video-Tuner/Netzgerät

September 1981

TOKAI WORKS

Einstellungen

VT-6500E

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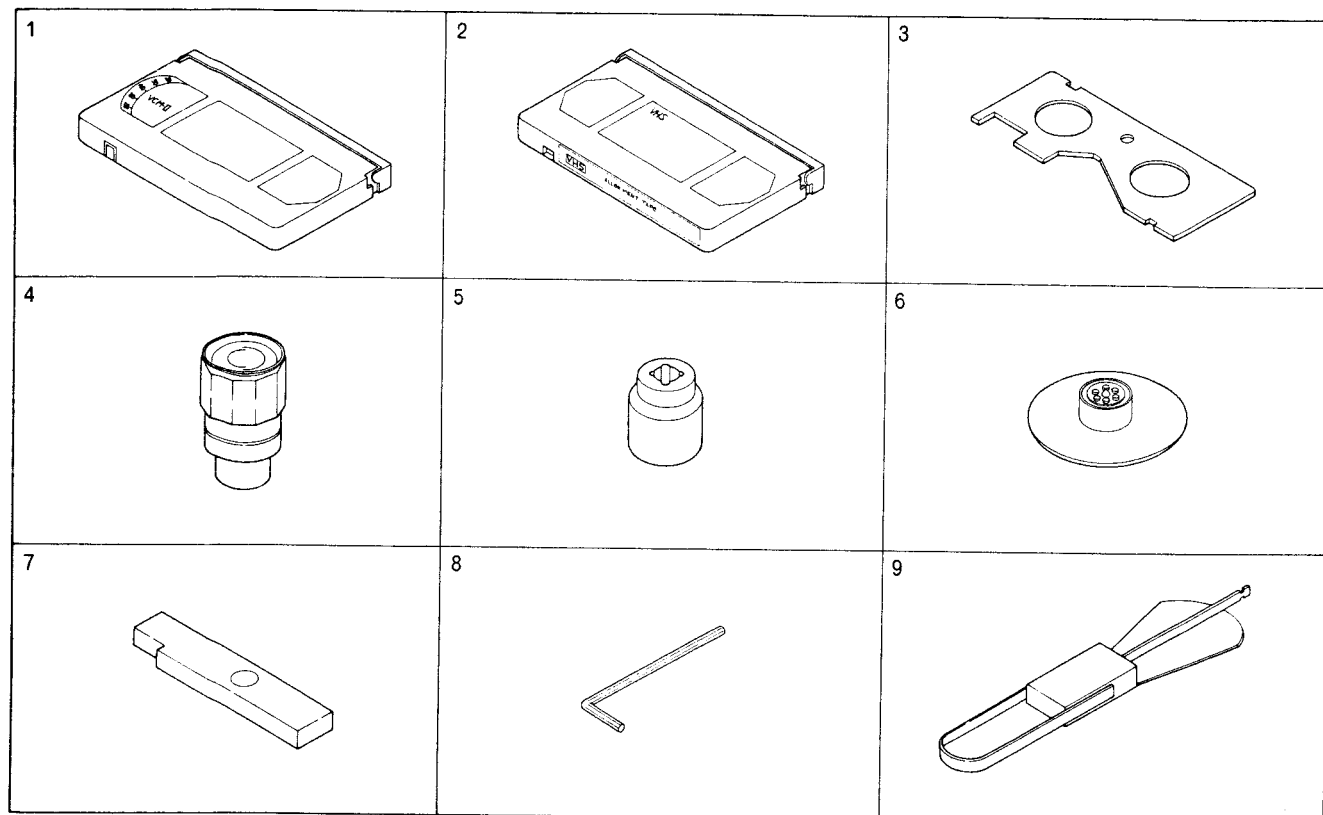
Die Abgleiche sind in diesem Informationsmaterial beschrieben.

Die Schaltpläne und die Diagramme der Leiterplatten sind der Wartungs-
anleitung für die Modelle VT-6500E, VT-TU65E, A-V60E (No.1587)

Zu entnehmen.

EINSTELLUNGEN

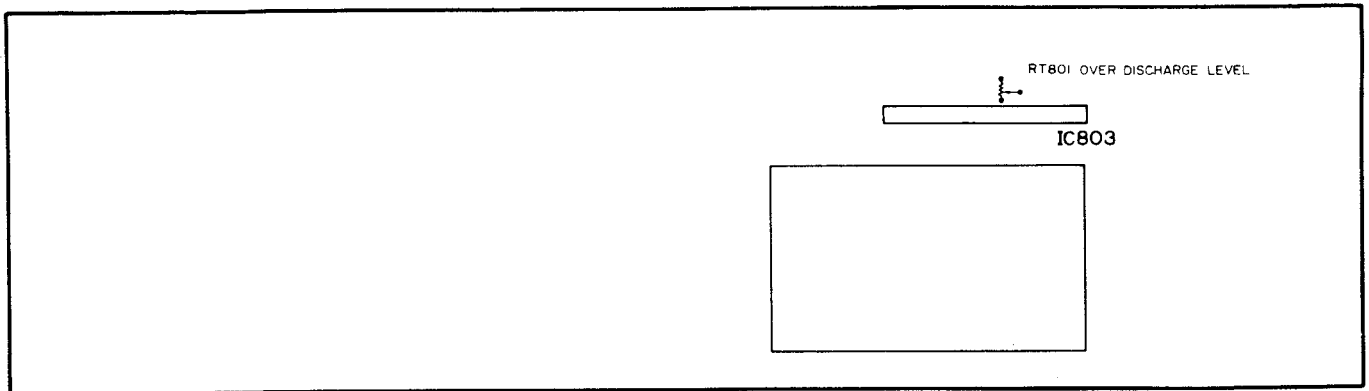
Wartungsvorrichtungen und Werkzeuge



- | | |
|---|----------------------------------|
| ① Bandspannungs-Anzeigedisplay | ⑥ Wickelteller-Höheneinstellehre |
| ② Einstellband | ⑦ Bandspannungs-Meßspule |
| ③ Cassettenschacht-Positioniervorrichtung | ⑧ Sechseckige Schraubenschlüssel |
| ④ Adapter für Drehmomentmesser | ⑨ Spannungsmesser |
| ⑤ Drehmomentmesser | |

VT-6500E

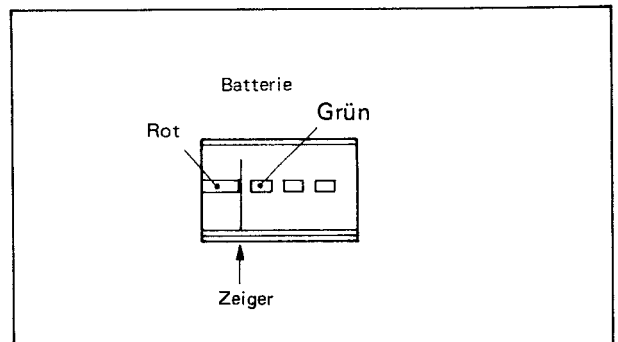
1. Einstellungen der elektrischen Schaltkreise



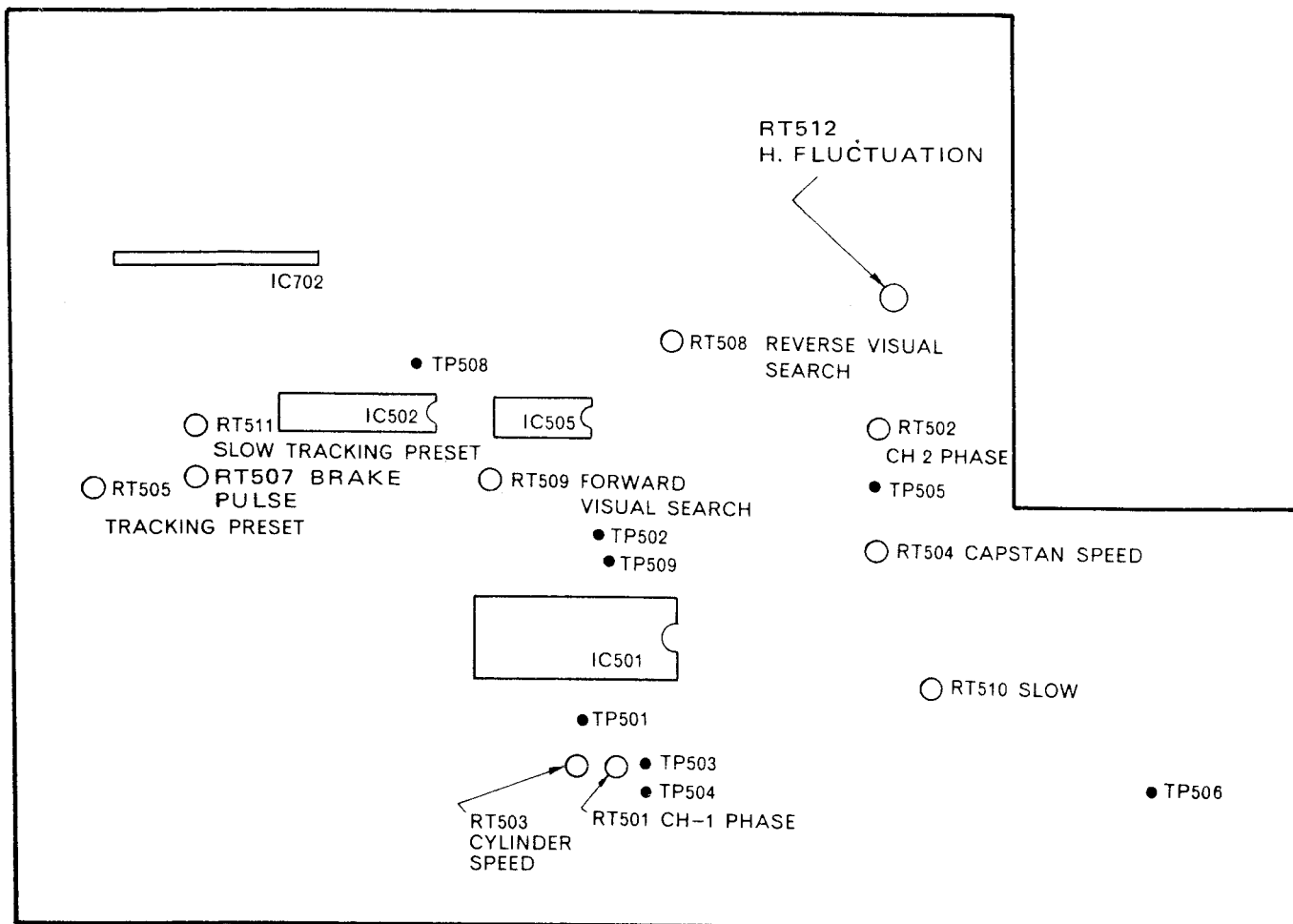
System-Regelungs-Leiterplatte
(Bestückungsseite)

Einstellung des Entladepegels

- 1) Den Regelwiderstand RT801 (OVER-DISCHARGE LEVEL) bis zum Anschlag im Uhrzeigersinn drehen.
- 2) Die Gleichstromversorgung an die interne Batteriebuchse des Video-Recorders anschließen.
Die Ausgangsspannung der Gleichstromversorgung auf $11,2 \pm 0,05V$ einstellen.
- 3) Den Betriebsschalter einschalten.
- 4) RT801 (OVER-DISCHARGE LEVEL) so einstellen, daß der Zeiger des Batterie-Prüfgerätes in die Mitte zwischen den grünen und roten Markierungen ausschlägt.



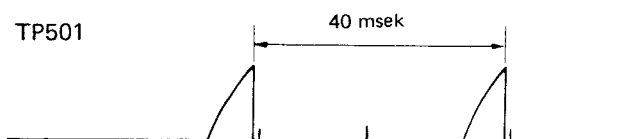
Einstellung der Servo-Schaltkreise



Servo-Leiterplatte (Leiterbahnseite)

1. Einstellung der Drehzahl der Bildkopftrommel

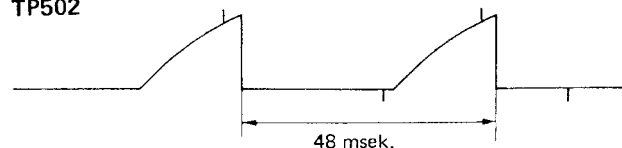
- 1) Ein Fernsehprogramm aufzeichnen.
- 2) Die Prüfpunkte TP503 und TP504 kurzschließen.
- 3) Ein Oszilloskop an TP501 anschließen.
- 4) RT503 (CYLINDER SPEED) so einstellen, daß der Impuls in der Dreieckswelle stillsteht.
- 5) Den Kurzschluß zwischen TP503 und TP504 wieder lösen.



2. Einstellung der Drehzahl der Antriebswelle

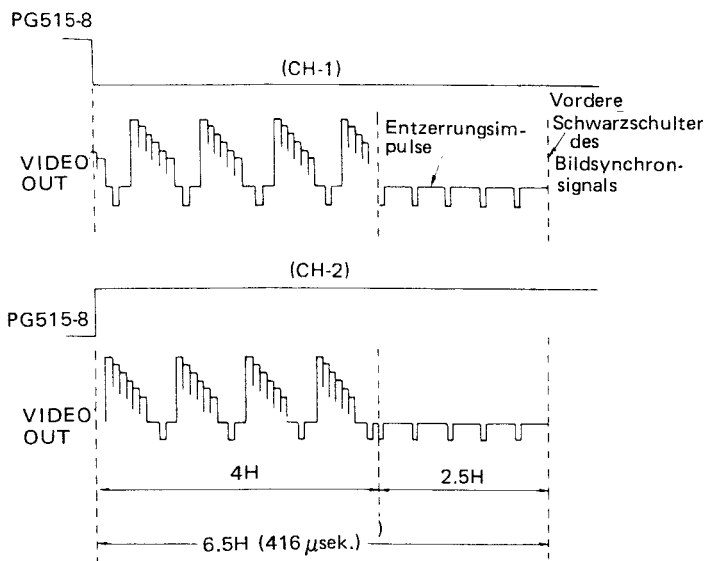
- 1) Ein Fernsehprogramm aufzeichnen.
- 2) Die Prüfpunkte TP503 und TP504 kurzschließen.
- 3) Ein Oszilloskop an TP502 anschließen.
- 4) RT504 (CAPSTAN SPEED) so einstellen, daß der Impuls in der Dreieckswelle stillsteht.
- 5) Den Kurzschluß zwischen TP503 und TP504 wieder lösen.

TP502



3. Phaseneinstellung für CH-1/CH-2

- 1) Das Abgleichband abspielen.
- 2) CH-1 des Oszilloskops an die Video-Ausgangsklemme und CH-2 an TP206 (SW25Hz) der Luminanz/Chroma-Leiterplatte anschließen.
- 3) Ein Synchronsignal an CH-2 anlegen, um die Synchronflanke auf "—" zu stellen.
- 4) RT504 (CH-1 PHASE) so einstellen, daß die vordere Schwarzscher des Bildsynchronsignals 6.5H nach der Abfallflanke der CH-2 Wellenform angeordnet ist.
- 5) Die Synchronflanke auf "+" stellen.
- 6) RT504 (CH-2 PHASE) so einstellen, daß die vordere Schwarzscher des Bildsynchronsignals 6.5H nach der Anstiegsflanke der CH-2 Wellenform angeordnet ist.



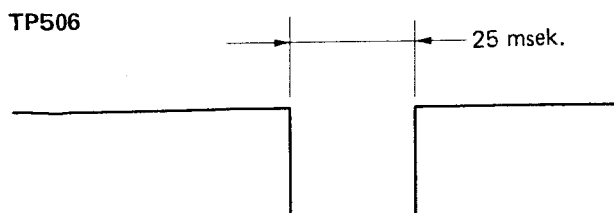
4. Spurlagen-Voreinstellung

- 1) Den Spurlagenregler in die Raststellung bringen.
- 2) Ein Fernsehprogramm aufzeichnen.
- 3) Ein Oszilloskop an TP203 der Luminanz/Chroma-Leiterplatte anschließen.
- 4) Die Aufnahme wiedergeben.
RT505 (TRACKING PRESET) so einstellen, daß die Phase der Punkte übereinstimmt, an welchen die Amplituden der CH-1 und CH-2 FM-Hüllkurven abfallen.

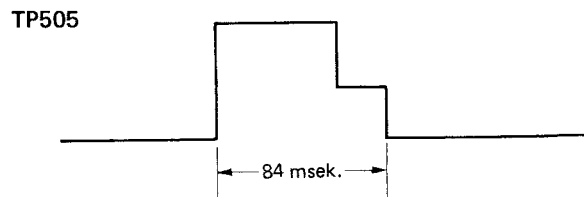


5. Einstellung des Bremsimpulses, der Zeitlupe und der Zeitlupen-Spurlage

- 1) Ein Fernsehprogramm aufzeichnen.
- 2) Die Fernbedienung anschließen und die Aufnahme in der Zeitlupenfunktion wiedergeben.
Die Zeitlupenfunktion auf etwa 1/5 einstellen und den Spurlagenregler in die Vertikalstellung bringen.
- 3) Ein Oszilloskop an TP506 anschließen.
- 4) RT507 (BRAKE PULSE) so einstellen, daß die Impulsbreite 25 msek. beträgt.



- 5) Das Oszilloskop an TP505 anschließen.
- 6) RT510 (SLOW) so einstellen, daß die Änderung der Impulsbreite 84 msek. beträgt.



- 7) RT511 (SLOW TRACKING PRESET) so einstellen, daß keine Rauschbalken im Bild der Wiedergabe erscheinen. Falls Rauschbalken auftreten, so einstellen, daß diese gleichmäßig über das Bild verteilt sind.

6. Bildsuchlauf-Einstellungen

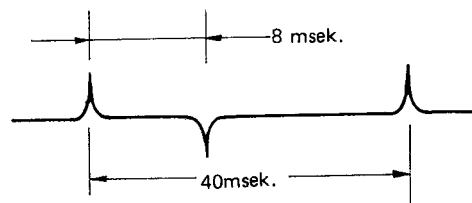
Bildsuchlauf in Vorlaufrichtung

- 1) Ein Oszilloskop an TP508 anschließen.
- 2) Ein Band abspielen, auf dem ein Farbbalkensignal aufgezeichnet wurde (Bildsuchlauffunktion in Vorlaufrichtung).
- 3) RT509 (FORWARD VISUAL SEARCH) so einstellen, daß die Impulsdauer 8 msek. beträgt.
- 4) RT509 so einstellen, daß die beiden Rauschbänder am Bildschirm stillstehen.

Bildsuchlauf in Rücklaufrichtung

- 1) Ein Oszilloskop an TP508 anschließen.
- 2) Ein Band abspielen, auf dem ein Farbbalkensignal aufgezeichnet wurde (Bildsuchlauffunktion in Rücklaufrichtung).
- 3) RT508 (REVERSE VISUAL SEARCH) so einstellen, daß die Impulsdauer 8 msek. beträgt.
- 4) RT508 so einstellen, daß die drei Rauschbänder am Bildschirm stillstehen.

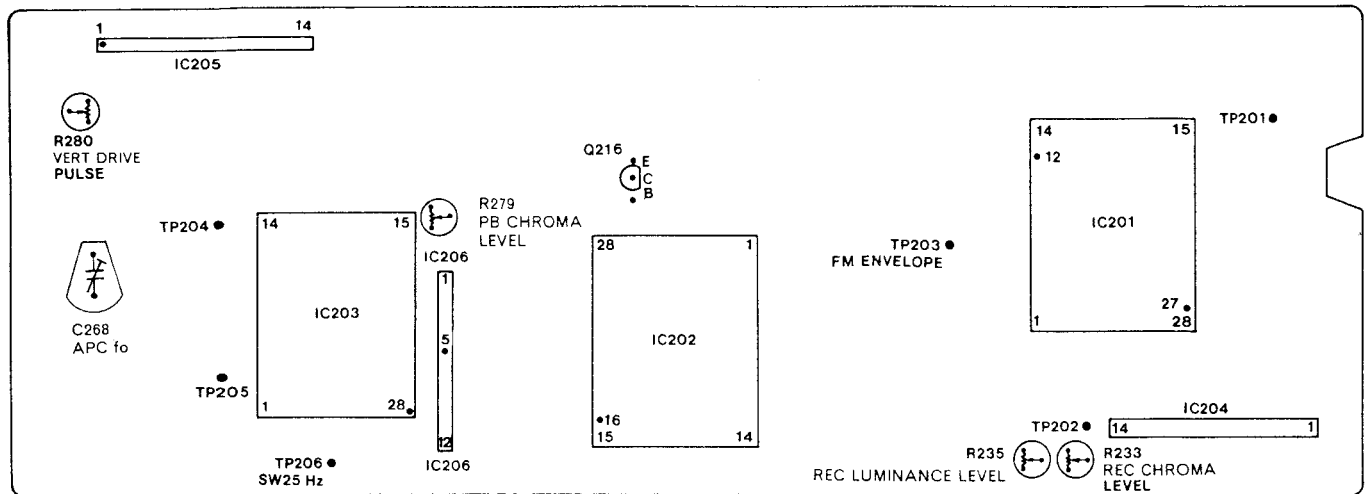
Hinweis: Die Einstellung für den Bildsuchlauf in Rücklaufrichtung hat nach der Einstellung für den Bildsuchlauf in Vorlaufrichtung zu erfolgen.



7. Horizontaler Bildfang

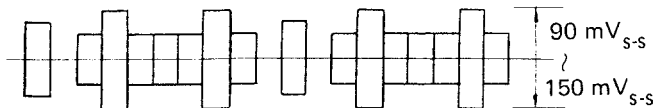
- 1) Den Video-Recorder an einen Fernsehempfänger anschließen.
- 2) Ein bespieltes Band einsetzen und den Recorder auf Zeitlupe schalten.
- 3) Den Zeitlupen-Regelknopf auf 1/5 stellen.
- 4) RT512 (H. FLUCTUATION) so einstellen, daß es zu minimalen horizontalen Bildschwankungen am Bildschirm kommt.

Einstellung des Luminanz/Chroma-Schaltkreises



1. Einstellung des Aufnahme-Luminanz/Chroma-Pegels

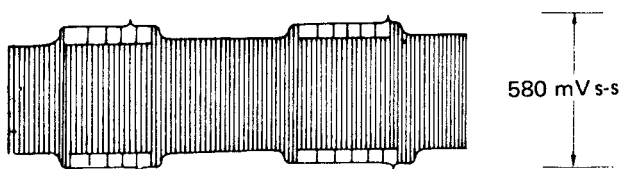
- 1) Einen Farbbalkengenerator an die Video-Eingangsklemme anschließen.
- 2) Ein Farbbalkensignal aufzeichnen.
- 3) Ein Oszilloskop an TP201 anschließen.
- 4) R235 (REC LUMINANC LEVEL) auf minimale Wellenform einstellen.
- 5) R233 (REC CHROMA LEVEL) so einstellen, daß der in der Tabelle gezeigte Farbpegelwert erhalten wird, wenn die Markierungen der Bildkopftrommel übereinstimmen.



Aufnahme-Chroma-Pegel

Bildkopftrommel-Markierung	Pegel
Ohne Markierungen	90 mV _{S-S}
1	100 mV _{S-S}
2	120 mV _{S-S}
3	140 mV _{S-S}
4	150 mV _{S-S}

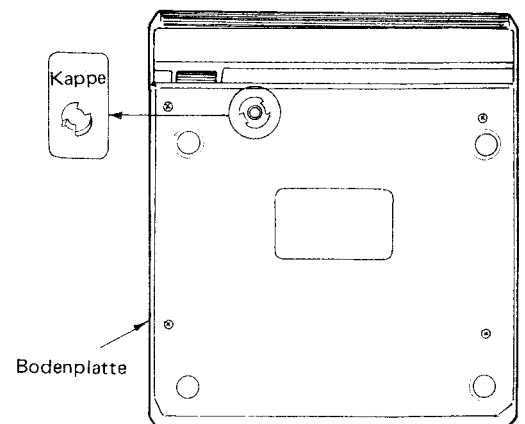
- 6) R235 (REC LUMINANC LEVEL) auf einen Luminanz-Pegel Von 580 mV_{S-S} Einstellen.



2. Einstellung des Bildaustastimpulses

- 1) Ein Fernsehprogramm aufzeichnen.
- 2) Das bespielte Band in der Stehbildfunktion abspielen.
- 3) R280 (VERT DRIVE PULSE) so einstellen, daß das Bild nicht schwankt.
- 4) Auf die Zeitlupenfunktion schalten und darauf achten, daß das Bild nicht schwankt.
- 5) Nachjustieren, falls Bildschwankungen auftreten.

Hinweis: Diese Einstellung kann durchgeführt werden, indem die Kappe von der Unterseite des Gerätes (siehe nachfolgende Abbildung) abgenommen wird, ohne daß die obere Abdeckung bzw. die Bodenplatte entfernt werden muß.

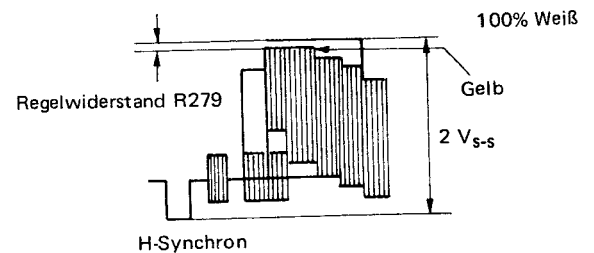


3. Einstellung der automatischen Phasenregelung (APC)

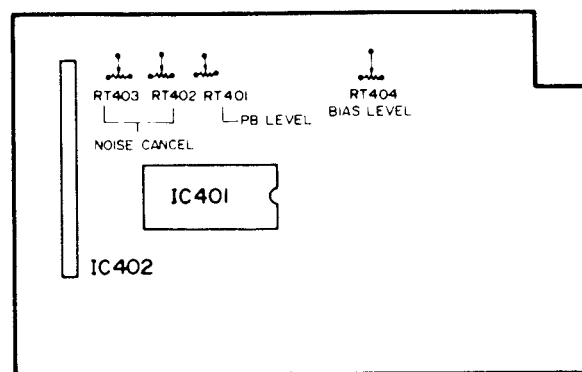
- 1) Den Video-Recorder auf die Stoppfunktion schalten.
- 2) Einen Frequenzzähler an TP204 anschließen.
- 3) C268 so einstellen, daß der Frequenzzähler eine Frequenz von 4,435572 MHz \pm 50 Hz anzeigt.

4. Einstellung des Wiedergabe-Chromapegels

- 1) Das Farbbalkensignal des Abgleichbandes wiedergeben.
- 2) Ein Oszilloskop an den Video-Ausgang anschließen.
- 3) R279 (PB CHROMA LEVEL) so einstellen, daß die in der Abbildung gezeigte Wellenform erhalten wird.



Einstellung des Audio-Schaltkreises (Audio-Leiterplatte)



Audio-Leiterplatte
(Bestückungsseite)

1. Einstellung des Wiedergabe-Tonpegels

- 1) Das 1 kHz Signal des Abgleichbandes abspielen.
- 2) Ein Röhrenvoltmeter an die Audio-Ausgangsklemme anschließen.
- 3) RT401 (PB LEVEL) auf einen Pegel von $-6 \text{ dB} \pm \text{dB}$ einstellen.

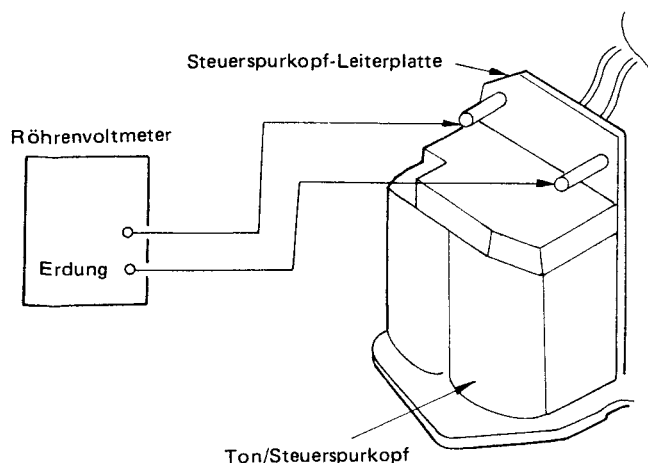
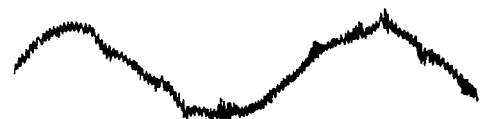
2. Einstellung des Vormagnetisierungspegels

- 1) Eine Leer-Cassette einsetzen und den Video-Recorder auf Aufnahme schalten.
- 2) Ein Röhrenvoltmeter an 2 Stifte der Steuerspurkopf-Leiterplatte anschließen.
- 3) RT404 (BIAS LEVEL) auf einen Pegel von $1,1 \pm 0,05 \text{ mV}$ (effektiv) einstellen.

3. Einstellung des Rauschbegrenzers

- 1) Eine Leer-Cassette einsetzen und den Video-Recorder auf Wiedergabe schalten.
- 2) Die CH-1 Sonde des Oszilloskops an den Audio-Ausgang anschließen.
- 3) RT402 und RT403 (NOISE CANCEL) abwechselnd einstellen, um minimales Rauschen in der CH-1 Wellenform zu erhalten.

Audio-Ausgang (AUDIO OUT)



2. Mechanische Einstellungen

Einstellung der einzelnen Baugruppen

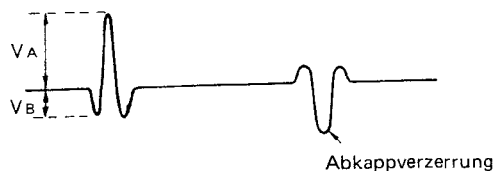
Einstellung der Bildkopftrommel

1) (Grobeinstellung)

Die Befestigungsschraube des Tachosignalgebers lösen und die Konsole des Tachosignalgebers so einstellen, daß zwischen Kopf und Magnet ein Abstand von $0,5 \pm 0,1$ mm erhalten wird.

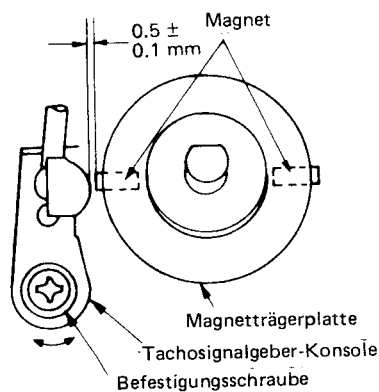
(Feineinstellung)

Die Wellenform an Stift 2 des IC501 (HA-11727) beobachten und den Abstand so einstellen, daß die vorgeschriebene Anzahl an Signalwellen erhalten wird.



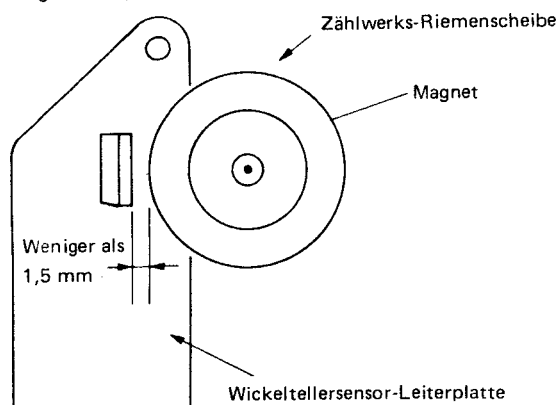
Den obigen positiven Impuls beobachten und die Einstellung so vornehmen, daß die folgende Bedingung erfüllt wird: $V_A \ 0,75 \text{ Vs-s}$ $V_B \ 0,39 \text{ Vs-s}$

- Den anderen Magnet auf die gleiche Weise einstellen und die Schrauben festziehen, nachdem beide Magnete die obige Bedingung erfüllen.



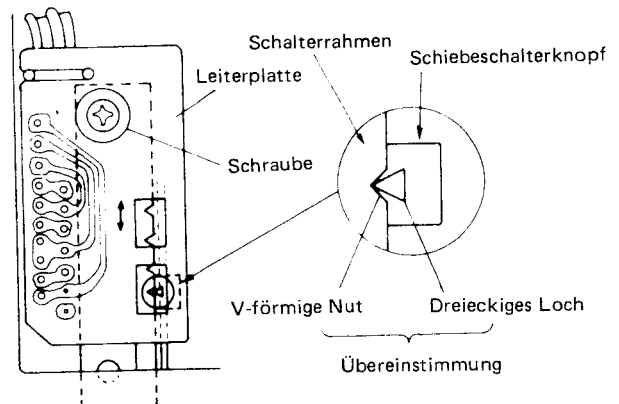
Einstellung des Wickeltellersensors

- Die Befestigungsschrauben der Leiterplatte des Wickeltellersensors lösen.
- Die Schrauben wieder festziehen, nachdem der Abstand zwischen dem Sensor und dem Magnet auf weniger als 1,5 mm eingestellt wurde.



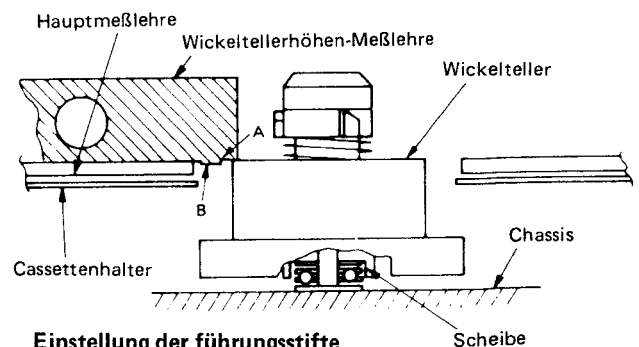
Einstellung des mechanischen Sensorschalters

- Die Riemenscheibe bis zum Anschlag in die Ausfädelrichtung drehen.
- Die Befestigungsschraube lösen und den Schalter verschieben, bis die V-förmige Nut des Schalters und die dreieckige Bohrung (gesehen von oben) übereinstimmen.
- Die Befestigungsschraube wieder festziehen.



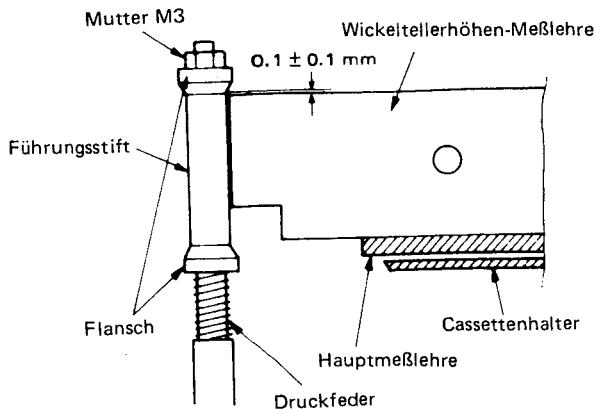
Einstellung der Wickeltellerhöhe

- Die Hauptmeßlehre in den Cassettenhalter einsetzen und den Cassettenhalter hochheben.
- Die Wickeltellerhöhen-Meßlehre auf die Hauptmeßlehre setzen und an den Wickelteller bringen.
- Mittels Einstellscheiben (Stärke 0,25 mm oder 0,5 mm) an der Unterseite des Wickeltellers die Wickeltellerhöhe so einstellen, daß der Wickelteller zwischen den Punkten A und B der Meßlehre liegt. (Die Einstellscheiben zwischen dem Wickelteller und der Metallscheibe einsetzen.)



Einstellung der führungsstifte

- Die Hauptmeßlehre in den Cassettenhalter einsetzen.
- Die Wickeltellerhöhen-Meßlehre an der Hauptmeßlehre anbringen und leicht gegen den führungsstift drücken drehen und den Abstand zwischen Oberkante.
- Die Mutter an der Oberseite der Führungsstiftes der Meßlehre und oberen Flansch auf $0,1 \pm 0,1$ mm einstellen.
- Die Meßlehre entfernen.
- Die Bandlaufwerk-Einstellung durchführen.



Einstellung des Steuerspurkopfes (Grobeinstellung)

Einstellung des Neigungswinkels

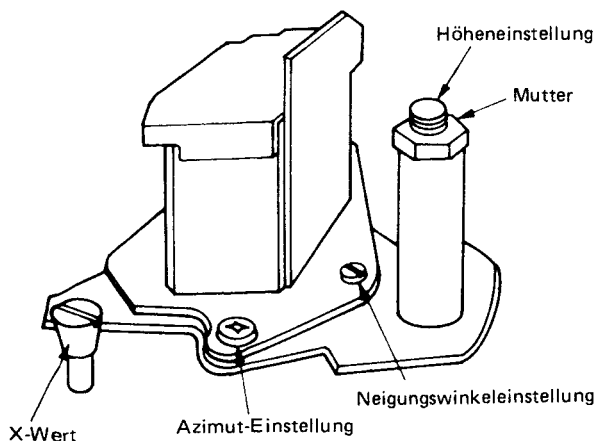
- 1) Die Hauptmeßlehre in den Cassettenhalter einsetzen und die Wickeltellerhöhen-Meßlehre in die Nähe des Steuerspurkopfes bringen.
- 2) Die Neigungswinkel-Einstellschraube drehen, bis die Oberfläche des Steuerspurkopfes parallel zur Oberfläche der Meßlehre liegt.

Azimut-Einstellung

- 1) Die Azimut-Einstellschraube drehen, bis die Seite des Steuerspurkopfes parallel zur Seite der Wickeltellerhöhen-Einstellehre liegt.
- 2) Die Meßlehre entfernen.

Höheneinstellung

- 1) Ein Magnetband einfädeln und im eingefädelten Zustand auf die Stoppfunktion schalten.
- 2) Die Höheneinstellschraube drehen, bis die Oberkante des Kerns des Tonlöschkopfes etwas über dem Magnetband (0,2 mm oder weniger) liegt. Die Unterseite des Kerns des Steuerspurkopfes sollte dabei etwas über das Band überstehen.



(Feineinstellung)

Einstellung des Neigungswinkels

- 1) Ein Magnetband mit einem 6 kHz Tonsignal (Abgleichband) abspielen.
- 2) Ein Oszilloskop an den Audio-Ausgang anschließen.
- 3) Die Neigungswinkel-Einstellschraube so einstellen, daß minimale Tonpegelschwankungen am Audio-Ausgang sichergestellt sind.

Azimut-Einstellung

- 1) Die Azimut-Einstellschraube auf maximalen Pegel des 6 kHz Signals am Audio-Ausgang einstellen.

Höheneinstellung

- 1) Die Höheneinstellschraube auf maximalen Audio-Ausgang einstellen.

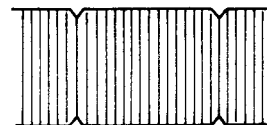
X-Wert-Einstellung

- 1) Die Bewegung der Ton/Steuerspurkopf-grundplatte nach rechts/links mit Hilfe der X-Wert-Schraube so einstellen, daß der Ausgang der FM-Hüllkurven-Wellenform ein Maximum annimmt, wobei der Spurlagenregler in seiner Raststellung sein muß.

Abgleichcassette

Oszilloskop

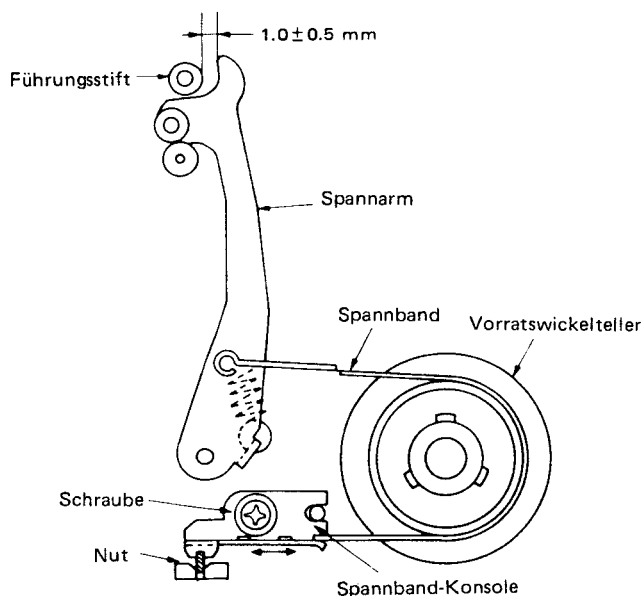
Hüllkurven-Wellenform (TP203/TP206 (Trigger) der Luminanz/Chroma-Leiterplatte)



Einstellung der Position und der Spannung des Spannstiftes

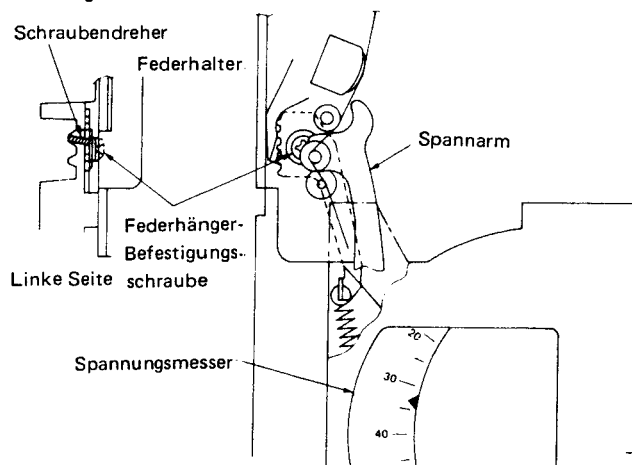
Einstellung der Position

- 1) Das Lichtfenster des Vorratsteller-Bandendensors mit Papier usw. addecken.
- 2) Den Video-Recorder auf Wiedergabe schalten, ohne eine Cassette einzusetzen.
- 3) Die Spannband-Befestigungsschraube lösen und einen Schraubendreher zwischen dem Bandhalter und der Nut im Chassis einführen.
- 4) Den Bandhalter mittels Schraubendreher bewegen und den Abstand zwischen dem Spannarm und der festen Führung auf $1,0 \pm 0,5$ mm einstellen.
- 5) Den Video-Recorder auf die Stoppfunktion schalten und die Schraube festziehen.



Spannungseinstellung

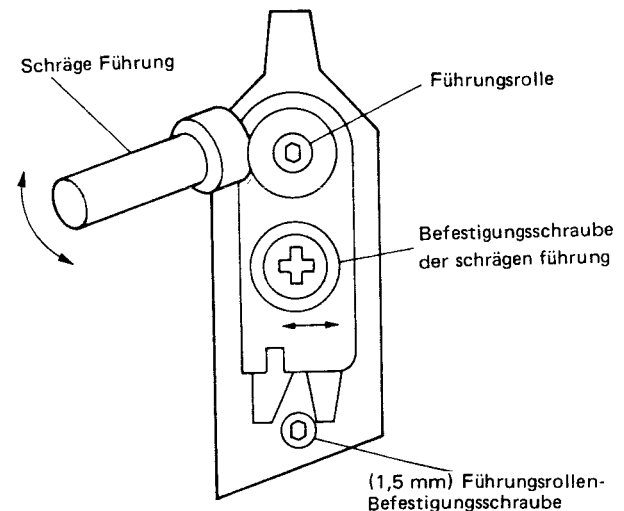
- 1) Die Befestigungsschraube des Federhalters lösen.
- 2) Den Spannungsmesser anbringen und den Video-Recorder auf Wiedergabe schalten.
- 3) Einen Schraubendreher in die Einstellnut an der linken Seite des Gerätes einschieben.
- 4) Den Federhalter bewegen und die Spannung auf 30 – 45 g.cm einstellen.



- 5) Den Video-Recorder auf die Stoppfunktion schalten und die Schraube festziehen. Nach der Einstellung der Spannung sollte nochmals die Position des Führungsstiftes kontrolliert werden. Falls beide Werte nicht stimmen, die Einstellung wiederholen.
- 6) Das Papier, das am Lichtfenster des Sensors angebracht wurde, nach Beendigung der Einstellung entfernen.

Einstellung der schrägen Föhrung

- 1) Ein leeres Band abspielen.
- 2) Die Befestigungsschraube der schrägen Föhrung lösen.
- 3) Die Föhrung so einstellen, daß das Band keine Falten aufweist, und die Befestigungsschraube festziehen. Dabei darf jedoch die Föhrungsrollen-Befestigungsschraube nicht gedreht werden.
- 4) Die Bandlaufwerk-Einstellung vornehmen.



Prüfen der Drehmomente der verschiedenen Teile

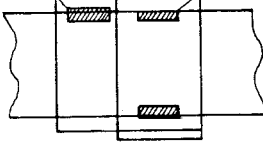
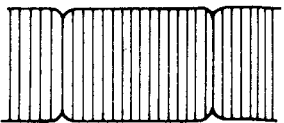
Die nachfolgenden Werte sind Bezugswerte.

	Benennung	Betriebsart	Gemessen an	Meßwert
1	Hauptbremsmoment	Stopp	Beide Wickelteller	200 gcm oder mehr
2	Spannmoment	Ausfädeln	Vorratsteller	100–200 gcm
3	Rücklauf	Rücklauf	Vorratsteller	400 gcm oder mehr
4	Aufspulen	Wiedergabe	Wickelteller	70–120 gcm
5	Schnellvorlauf	Schnellvorlauf	Wickelteller	400 gcm oder mehr
6	Vorratstellerspannung	Schnellvorlauf	Vorratsteller	4–15 gcm
7	Wickeltellerspannung	Rücklauf	Wickelteller	4–15 gcm
8	Wickelteller-Bremsmoment	(1) «Bildsuchläuf (2) Einfädeln (3) Ausfädeln (4) Aufnahme-Pause	Wickelteller	80–140 gcm
9	Suchlaufmoment	« Bildsuchlauf	Vorratsspule	230–300 gcm

Einstellung des Bandtransportes

Wenn die obere Bildkopftrommel oder der Ton/Steuer-spurkopf erneuert bzw. aus- und wiedereingebaut oder wenn die Bandführungsteile (fester Führungsstift, Andruck-rolle, Führungsrolle usw.) erneuert wurden, muß der Bandtransport eingestellt werden. Die nachfolgend gezeigt-

ten Teile dürfen nicht ausgebaut bzw. verstellt werden, da diese Teile mit Hilfe von Meßlehren genau eingestellt wurden; wenn diese Teile ausgebaut bzw. verstellt werden, kann der Bandtransport nicht richtig eingestellt werden.

Prüfpunkt	Beurteilungskriterium	Werkzeug/Meßinstrument
Spannung	30–45 gcm (Video-Recorder Waagrecht)	Spannungsmesser
Führungsstift	Das Band sollte am unteren Flansch entlanggleiten und keine Falten bilden.	Sichtprüfung
Schräge Führung und Führungsrolle	Band darf keine Falten bilden. Kein Staub darf anhaften.	Sichtprüfung
Band	Das Band darf keine Falten aufweisen	Sichtprüfung
Andruckrolle	Die Rolle sollte glatt drehen	Sichtprüfung
Ton/Steuer-spurkopf	Das Band sollte guten Kontakt mit den Kernen des Steuer-spur- und des Tonkopfes haben. Überstand ca. 0,2 mm 	Sichtprüfung. Linkes Diagramm zeigt Bezugswert.
Hüllkurve Wiedergabe- Treppenwelle vom Abgleich- band	Bildschwankungen sollten nicht auftreten Die Mindestbreite der Hüllkurve sollte wenigstens 60% der Maximalbreite der Hüllkurve (bei schlechtester Spurlageneinstellung) betragen. Die Breitenschwankungen der Hüllkurve sollten weniger als 20% betragen. Bei in der Raststellung befindlichem Spurlagenregler sollte die Hüllkurve mehr als 80% der Maximalbreite aufweisen.	Oszilloskop (TP203, TP206, Trigger)  Hüllkurve

Abhängig von den erneuerten Teilen sind die folgenden Einstellungen durchzuführen, nachdem die Teile eingebaut wurden.

1. Wenn die obere Bildkopftrommel erneuert wurde.

	Beurteilungskriterium
Führungsrollenhöhe	Das Band sollte keine Falten aufweisen
Winkel der schrägen Führung	Schwankungen und Ebenheit der Hüllkurve prüfen
Bildkopfwechsel	Die folgenden Einstellungen prüfen: Seite 4 Abschnitt 3 CH-1/CH-2 Phaseneinstellung (Schaltpunkt) Seite 5 Abschnitt 4 Spurlageneinstellung Seite 6 Abschnitt 1 Aufnahme-Luminanz/Chroma-Pegeleinstellung und Wiedergabe-Chroma-Pegeleinstellung

2. Wenn der Ton/Steuerspurbkopf erneuert wurde:

	Beurteilungskriterium
Höhe des Ton/ Steuerspurbkopfes	Tonspur- oder Steuerspurbreite prüfen
Azimut des Ton/ Steuerspurbkopfes	Ton-Wiedergabepegel auf ein Maximum einstellen.
Neigung des Ton/ Steuerspurbkopfes	Band muß oben und unten gespannt sein.
X-Wert-Position	Tonschwankungen dürfen nicht auftreten

3. Wenn die Führungsrolle und die schräge Führung erneuert wurden:

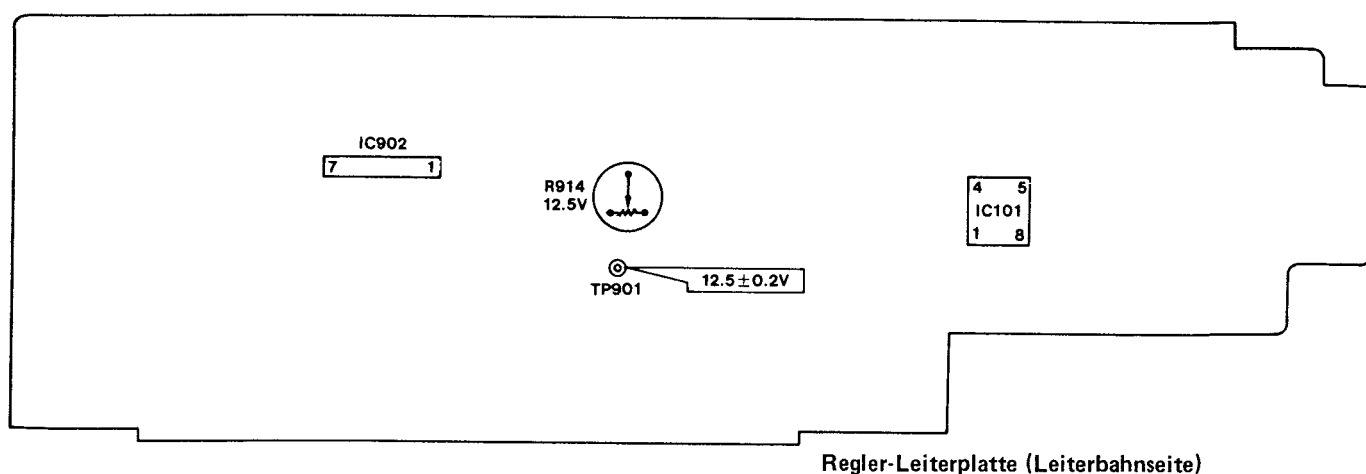
Gleich wie in Punkt 1.

4. Wenn der Führungstift erneuert wurde:

	Beurteilungskriterium	Werkzeug
Führungstifthöhe	Band darf keine Falten aufweisen Hüllkurve darf keine Schwankungen aufweisen	Mutterschlüssel Oszilloskop

VT-TU65E

Einstellung der elektrischen Schaltkreise



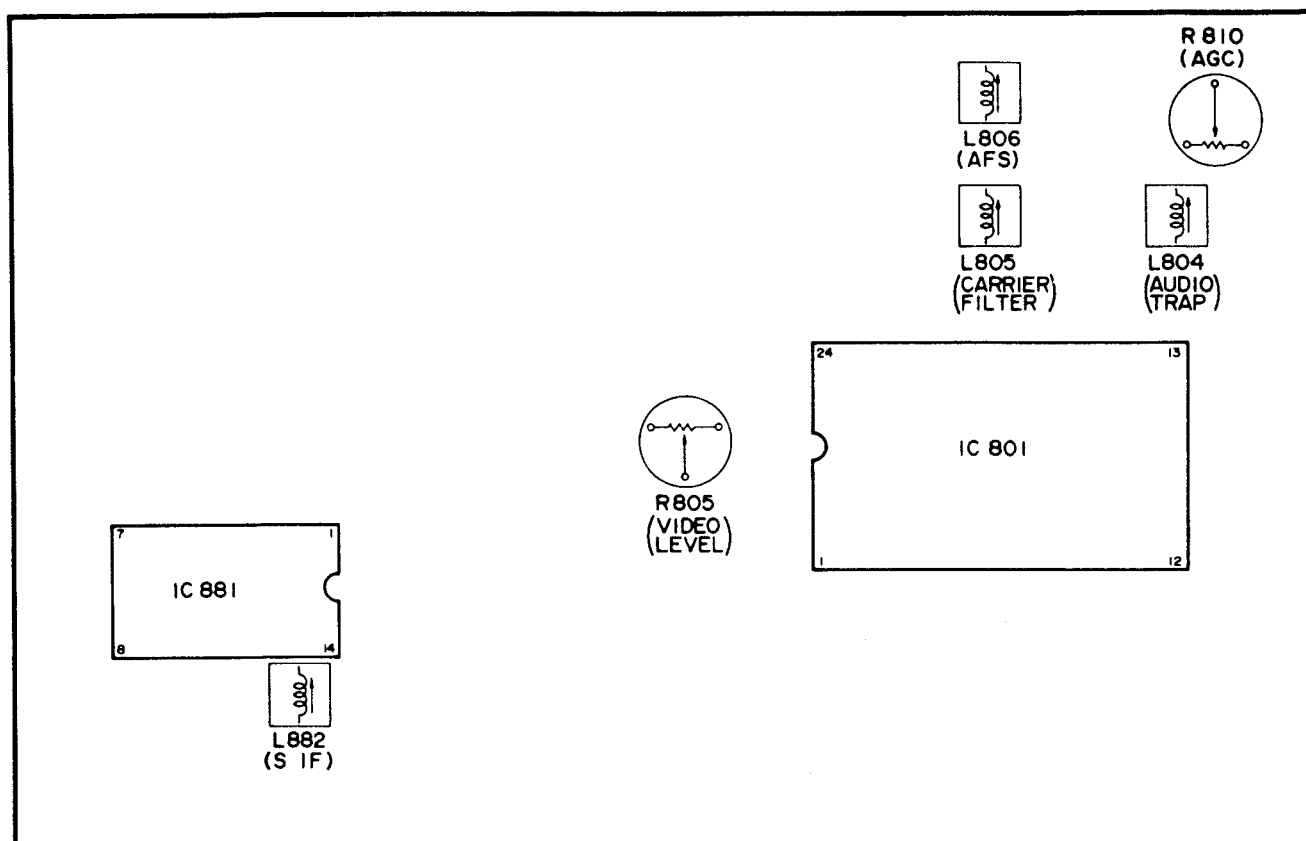
Regler-Leiterplatte (Leiterbahnseite)

12,5 V Einstellung

1. Den Video-Tuner (VT-TU65E) an den Video-Recorder anschließen.
2. Den Betriebsschalter des Video-Recorders einschalten.
3. Einen Gleichspannungsmesser an TP901 anschließen.
4. R914 (12,5 V) so einstellen, daß am Voltmeter eine Spannung von $12,5 V \pm 0,2 V$ angezeigt wird.

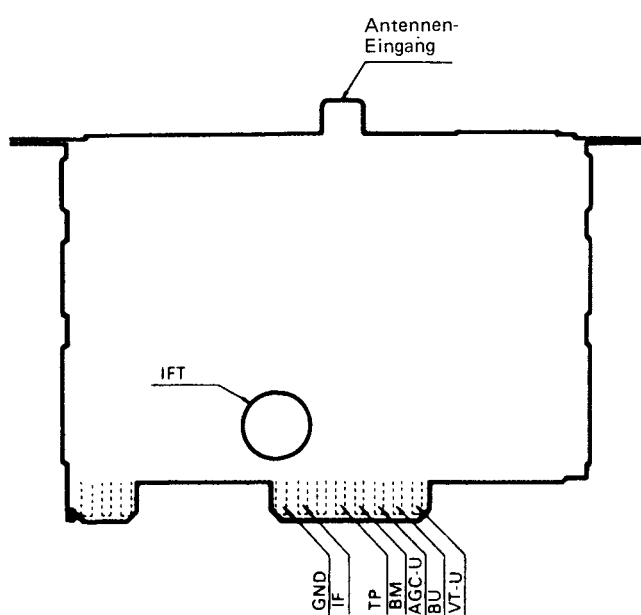
Einstellung des Tuner/ZF-Schaltkreises (Tuner · IF)

Anordnung der Einstellteile und Prüfpunkte



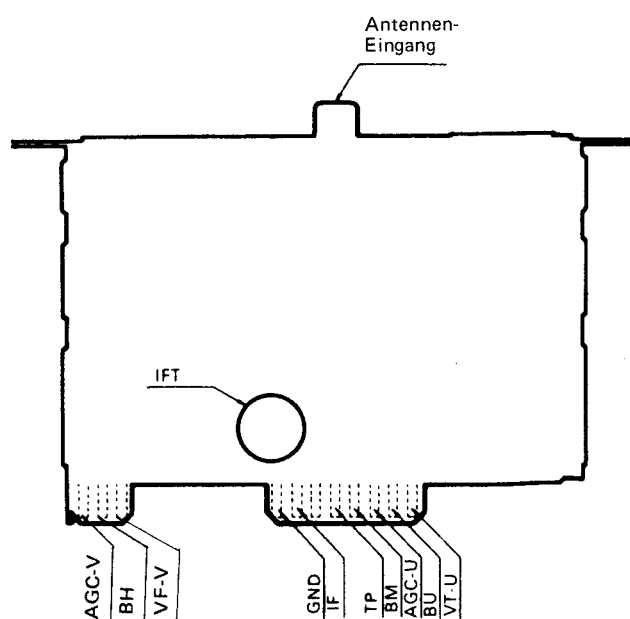
AF-Leiterplatte (Bestückungsseite)

ET-548 (Modell für Großbritannien)



ET-548

ET-541 (Ausgenommen Großbritannien)



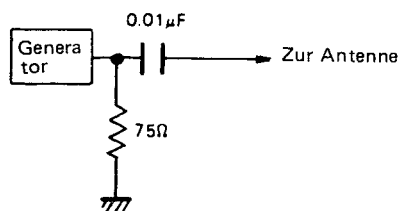
ET-541

1. Einstellung des trägerfrequenzfilters und der Videosignalamplitude (CARRIER FILTER)

Einstellposition: L805, R805

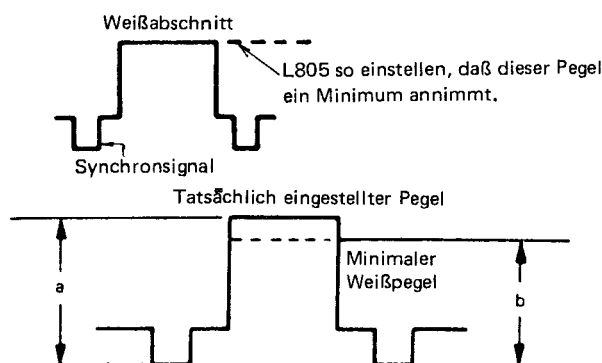
Vorbereitung

- 1) Eingangssignal
Die folgenden Signale am Antennen-Eingang einspeisen.
a. Generator für weißes Testbild mit HF-Ausgang.
- 2) Das Oszilloskop an IC801-24 anschließen (auf Gleichstrombereich stellen).
- 3) Den Betriebsschalter einschalten.
- 4) Signalpegel
−41 dBm ± 10 dBm (umgewandelt in Antennen-Eingang)
0 dBm = 1 mW



Einstellvorgang

- 1) Den Kern von L805 im Uhrzeigersinn drehen, bis er die Leiterplatte berührt.
- 2) Danach den Kern langsam gegen den Uhrzeigersinn drehen, um zu überprüfen, ob die normale Detektor-Wellenform und der Weißabschnitt (gezeigt in Abb. 17) größer als das Minimum sind. Aus dieser Position ist der Kern im Uhrzeigersinn zu drehen; den Kern freigeben, bevor der Weißabschnitt größer wird. Einstellgenauigkeit: b/a (gezeigt in der Abbildung) sollte 0 + 0,5 − 0 dB sein.
- 3) R805 (VIDEO LEVEL) so abgleichen, daß der Video Signalpegel 1,25 ± 0,05 Vs-s beträgt.

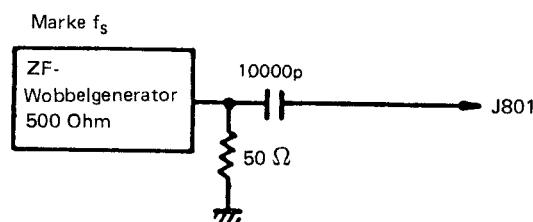


2. Einstellung des Audio-Traps (AUDIO TRAP)

Einstellposition: L804

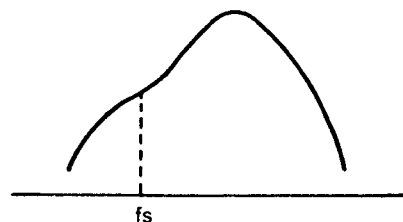
Vorbereitung

- 1) Eingangssignal
Das folgende Signal an den prüfpunkt von ET-541 (ET-541) anlegen. Wobbelgenerator
- 2) Das Oszilloskop an IC801-24 anschließen.
- 3) AGC-Spannung
Den Stift 22 des IC801 mit Masse verbinden und an Stift 1 des IC801 eine Spannung von 8,6 +1, −0 V einspeisen.
- 4) Einen 50 Ohm Widerstand parallel zu L805 schalten (zwischen den Stiften 18 und 19 des IC801).



Einstellvorgang

L804 so einstellen, daß der Punkt der Wellenform an IC801-24 ein Minimum annimmt.

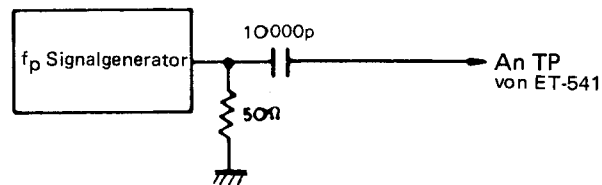


3. Automatische Feineinstellung (AFS)

Einstellposition: L806

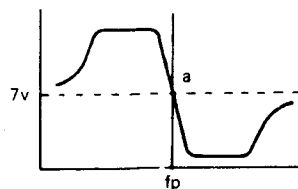
Vorbereitung

- 1) Eingangssignal
Das folgende Signal am Prüfpunkt von ET-541 (ET-548) einspeisen.
- 2) Ein Voltmeter an Stift 16 des IC801 anschließen.
- 3) AGC-Spannung
Den Stift 22 des IC801 mit Masse verbinden und eine Spannung von 8,6 V an Stift 12 anlegen.
- 4) Den Betriebsschalter einschalten.
- 5) Den Ausgangspegel des Signalgenerators so einstellen, daß die Wellenform an IC801-24 eine Amplituden-Modulation (AM) von 40% aufweist und 0,7 Vs-s beträgt.



Einstellvorgang

L806 so einstellen, daß mit dem f_p -Signal am Voltmeter eine Spannung von $7,0 \pm 1,0$ V angezeigt wird.

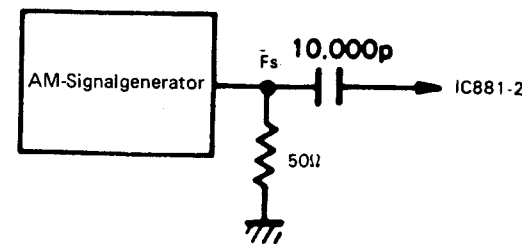


4. Ton-ZF-Einstellung (S IF)

Einstellpositon: L882

Vorbereitung

- 1) Ein AM-Bezugssignal an IC881-2 einspeisen.
Den Ausgang des AM-Standardsignalgenerators einstellen.
 - a. Trägerwellenfrequenz:
6,0 MHz \pm 5 kHz (für Großbritannien)
5,5 \pm 5 kHz (ausgenommen für Großbritannien)
 - b. Modulationsfrequenz: 400 Hz
 - c. Modulation: AM 30%
 - d. Ausgangspegel: -75 dBm bis -55 dBm
- 2) Den Stift 6 des IC881 mit Masse verbinden (dies ist nicht erforderlich, falls Stift 6 bereits mit Masse verbunden ist).
- 3) Das Oszilloskop an Stift 4 des CN801 anschließen.
- 4) Den Betriebsschalter einschalten.



Einstellvorgang

L882 so einstellen, daß die Signalamplitude ein Minimum annimmt.

5. Bild-ZF-Einstellung (P. IF)

Einstellposition: IFT des ET-541 (ET-548)

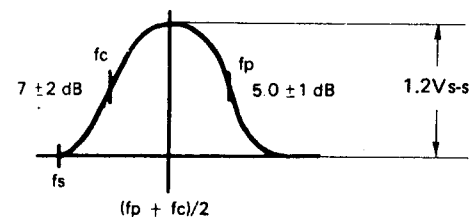
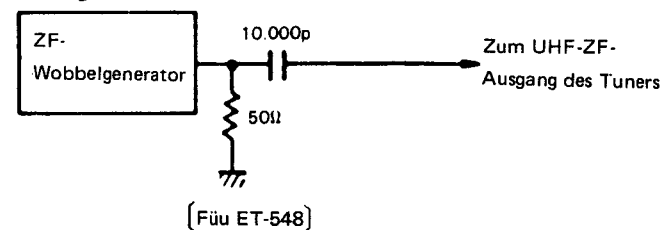
Vorbereitung

Verfahren mit Wobbelgenerator (vereinfachtes Verfahren)

- 1) Die folgende Spannung an den Tuner anlegen.
- 2) Spannung an die Leiterplatte anlegen.
- 3) Einen 50 Ohm Widerstand parallel zu L804 schalten (zwischen Stift 18 und 19 des IC801).
- 4) Ein Oszilloskop an TP801 anschließen.

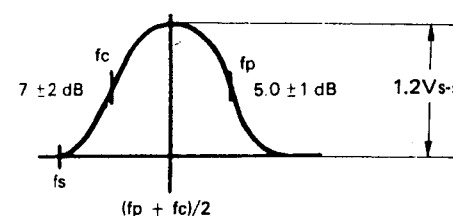
Einstellvorgang

Die Spule IFT so einstellen, daß der Spitzenwert der Wellenform in der Mitte des Bandes angeordnet ist und der Markenpegel innerhalb der nachfolgenden Werte liegt.



$$\begin{aligned} f_p &= 39.5 \text{ MHz} \\ f_c' &= 35.07 \text{ MHz} \\ f_s &= 33.5 \text{ MHz} \end{aligned}$$

(Für ET-541)



$$\begin{aligned} f_p &= 38.9 \text{ MHz} \\ f_c' &= 34.47 \text{ MHz} \\ f_s &= 33.4 \text{ MHz} \end{aligned}$$

6. Einstellung der automatischen Verstärkungsregelung (AGC)

Einstellposition: R810

Vorbereitung

- 1) Ein HF-Signal an der Antennenklemme einspeisen.
Signalpegel: -47 dBm (Antennen-Eingang)
- 2) Ein Voltmeter an die AGC-Klemme des Tuners anschließen. Ein Voltmeter mit einem Innenwiderstand von mehr als 100 k Ohm verwenden.

Einstellvorgang

Die Spannung ohne Signal messe (diese Spannung mit V1 bezeichnen). Danach das Signal einspeisen und R810 einstellen, bis V1 gleich +0,1/+0,1, -0,05 V beträgt (bei eingeschaltetem AFS-Schalter).

Da diese Einstellung durch Temperaturschwankungen des Schaltkreises beeinflußt wird, das Gerät aufwärmen, indem für mehr als zwei Minuten ein Signal im Empfangsbetrieb eingespeist wird.

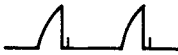
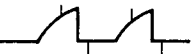
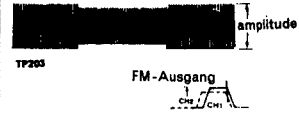
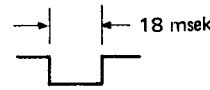
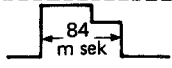
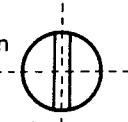
VT-6500E/VT-TU65E/A-V60E Einstell-Liste


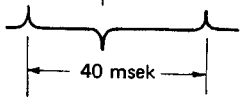
VT6500E

(Systemregelungs-Leiterplatte)


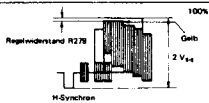
Einstellpunkt	Prüfpunkt	Meßinstrument oder Vorgang	Einstell-position	Meßwert
Überentladepegel	Batterie-Anzeige	Die Gleichstromversorgung an die interne Batteriebuchse anschließen und auf Gs 11,2 V einstellen.	RT801	Den Zeiger in die Mitte zwischen den grünen und roten Markierungen einstellen.

(Servo-Leiterplatte)

Bildtrommel-Drehzahl	TP501	<ul style="list-style-type: none">• Oszilloskop• TP504, TP503 Kurzschließen <p>Öffnen</p> 	RT503	Der Impuls stoppt an der Dreieckswelle
Antriebswellen-Drehzahl	TP502	<ul style="list-style-type: none">• Oszilloskop• Aufnahmebetrieb• TP504, TP503 Kurzschließen <p>Öffnen</p> 	RT504	Der Impuls stoppt an der Dreieckswelle
CH-1, CH-2 Phase	CH-1 Video-Ausgang CH-2 TP206 (SW25 Hz)	<ul style="list-style-type: none">• Oszilloskop: Synchronisiert durch TP206• Abgleichbank: Normale Wiedergabe <p>Snyhchronisation (–) Synchronisation (+)</p>	RT501 RT502	Die vordere Scharzschulter befindet sich 6,5H nach der Flanke der Synchro-nwellenform
Spurlage	TP203	<ul style="list-style-type: none">• Oszilloskop• Spurlagenregler: Raststellung• Aufnahme: Farbbalken (Fernsehsignal) <p>Wiedergabe</p>	RT505	Hüllkurve 
Horizontaler Bildfang	Fernseher	<ul style="list-style-type: none">• Ein bespieltes Band wiedergeben, mit etwa 1/5 Zeitlupe <p>Bildschirm</p>	RT512	Horizontale Bildsch-wankungen
Bremsimpuls	TP506	<ul style="list-style-type: none">• Oszilloskop• Aufnahme: Farbbalken (Fernsehsignal) <p>1/5 Zeitlupe</p> <ul style="list-style-type: none">• Zeitlupen–Spurlagenregler: Vertikalstellung	RT507	
Zeitlupe	TP505		RT510	
Zeitlupen-Spurlagenvorein-stellung	Fernseher	<ul style="list-style-type: none">• An Fernsehempfänger anschließen 	RT511	Rauschband aus Bild entfernen oder gleichmäßig oben und unten verteilen.

Einstellpunkt	Prüfpunkt	Meßinstrument und Vorgang	Einstell-position	Meßwert
Bildsuchkauf Bildsuchlauf in Vorlaufrichtung	TP508 TP507	<ul style="list-style-type: none">• Oszilloskop• Ein bespieltes Band wiedergeben : Farbbalken (Fernsehsignal) <p>Bildsuchlauf in Vorlaufrichtung</p>	RT509	
Bildsuchlauf in Rücklaufrichtung	TP507	<ul style="list-style-type: none">• Oszilloskop• Ein bespieltes Band wiedergeben : Farbbalken (Fernsehsignal) <p>Bildsuchlauf in Rücklaufrichtung</p>	RT508	

(Luminanz/Chroma-Leiterplatte)

Aufnahme-Farbpegel	TP201	<ul style="list-style-type: none">• Video-Eingang: Farbbalken• Oszilloskop	R235	Bildkopftrommel-Markierung Keine, (1)–(3): 100mV _{S-S} (4), (5): 160mV _{S-S}
Aufnahme-Luminanz-Pegel	TP201		R233	
Vertilaer Antriebsimpuls	Fernseher	<ul style="list-style-type: none">• Fernsehempfänger• Aufnahme <p>Stehbildfunktion</p>	R280	So einstellen, daß Bild nicht schwankt.
Automatischen Phasenregelung	TP204	<ul style="list-style-type: none">• Den Video-Recorder auf die stoppfunktion schalten.• Frequenzzähler	C268	4,435572 MHz ± 50 Hz
Wiedergabe -Chromapegels	Video-Ausgang anschließen	<ul style="list-style-type: none">• Das Farbbalkensignal de Adgleich-bandes wiedergeben	R279	

(Audio-Leiterplatte)

Wiedergabepegel	Audio-Ausgang	<ul style="list-style-type: none">• Röhrenvoltmeter• Abgleichband: 1 kHz Wiedergabe	RT401	–6 dB ± 1 dB
Vormagnetisierung	Prüfstift des Ton/Steuer-purkopfes	<ul style="list-style-type: none">• Röhrenvoltmeter• Aufnahmefunktion	RT404	1,5 ± 0,05 mV (effektiv)
Rauschbegrenzer	Audio-Ausgang	<ul style="list-style-type: none">• Leerband: Wiedergabe• OszilloskopCH-1: Audio-Ausgang	abwechselnd RT402	Minimales Rauschen

VT-TU65E

(Regler-Leiterplatte)

15,4V	TP901	<ul style="list-style-type: none">• Voltmeter• Video-Tuner (VT-TU65E) ↔ Video-Recorder (VT-6500E)	R914	12,5V ± 0,2V
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HITACHI

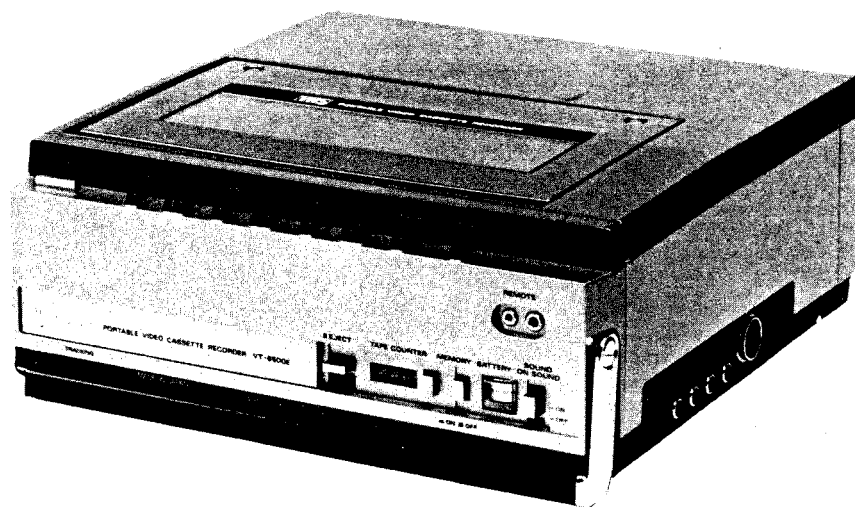
SERVICE MANUAL

TK

No. 1623E

VT-6500E

Trouble-Shooting



VHS

THIS VIDEO DECK IS A
VHS TYPE VIDEO RE-
CORDER.
FOR PROPER OPERA-
TION, ONLY VHS TYPE
CASSETTES MUST BE
USED.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

PORTABLE VIDEO CASSETTE RECORDER

Sep 1981

TOKAI WORKS

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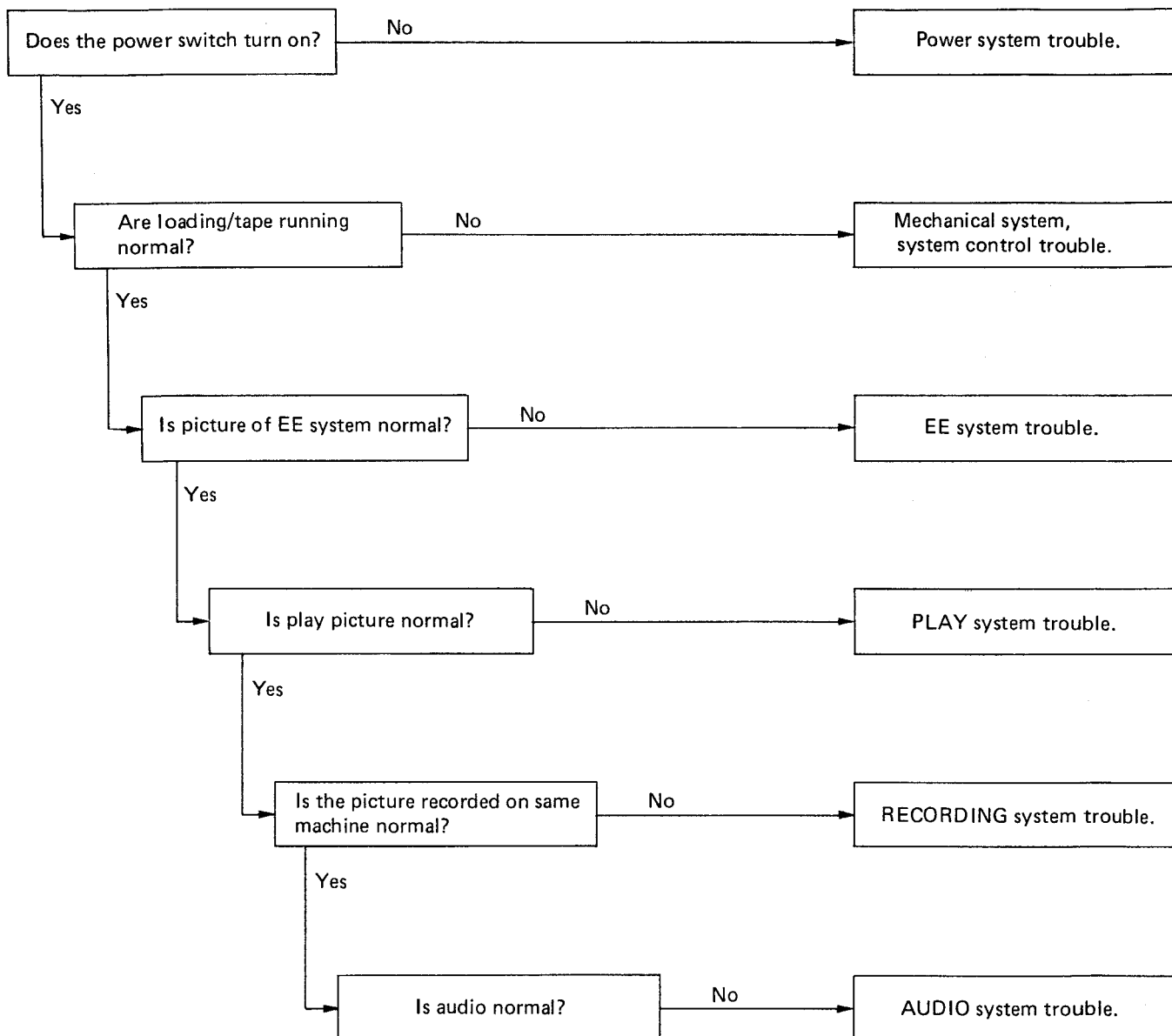
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I. TROUBLE-SHOOTING PROCEDURE

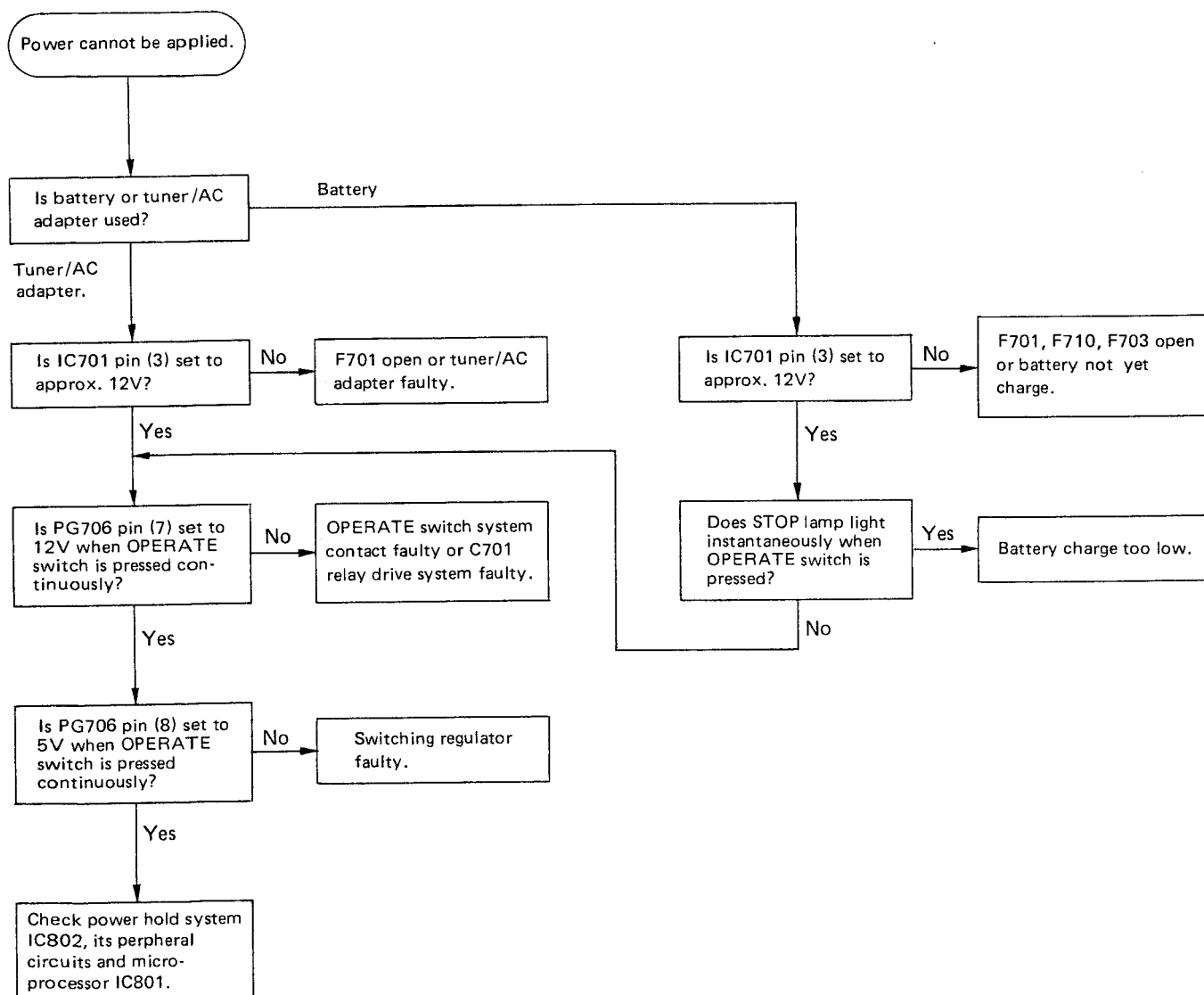
Perform various operations including playing back a normally recorded tape and recording/playback of the TV signal, etc. to check for troubles in the monitor picture and mechanical operation.



II. TROUBLE-SHOOTING

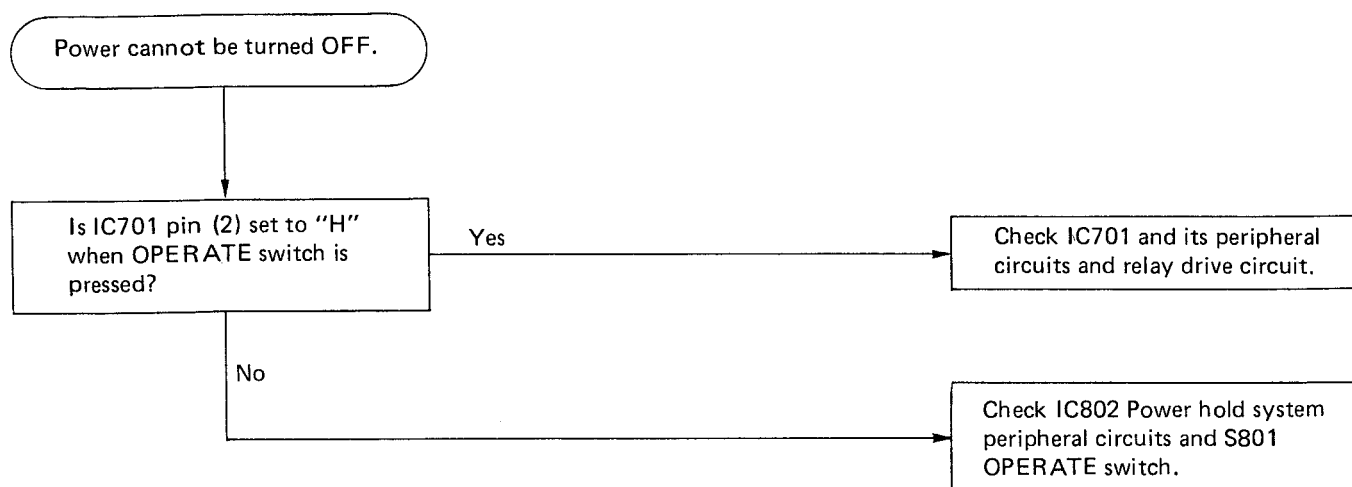
1. POWER SYSTEM

1-1. Power cannot be applied



	Cause	Remedy	Remarks
1	SYC PC Board B803 pin (7), (8) short-circuited	Replace the resistor block or resolder	
2	Servo PC Board PG711 contact faulty	Reinsert	
3	Servo PC Board IC701 (TA4308A) faulty	Replace IC	
4	3A fuse blown (F701)	Replace fuse	
5	4A fuse blown (F703)	Replace fuse	
6	PG712 contact faulty	Reinsert	
7	PG710 contact faulty	Reinsert	
8	RL701 contact faulty	Replace RL701	

1-2. Power cannot be turned OFF



	Cause	Remedy	Remarks
1	Solder on OFF side of SYC PC Board S801 touching	Resolder	

1-3 Power is switched off when a shock is applied

	Cause	Remedy	Remarks
1	SYC PC Board IC801 pin (11) contact faulty	Resolder	
2	SYC PC Board PG801 pin (13) contact faulty	Resolder	

1-4 Power SW turned OFF immediately

	Cause	Remedy	Remarks
1	SYC PC Board IC801 (HD44820A17) faulty	Replace IC	
2	SYC PC Board PG801 (13) contact faulty	Resolder	

1-5 Charging not possible

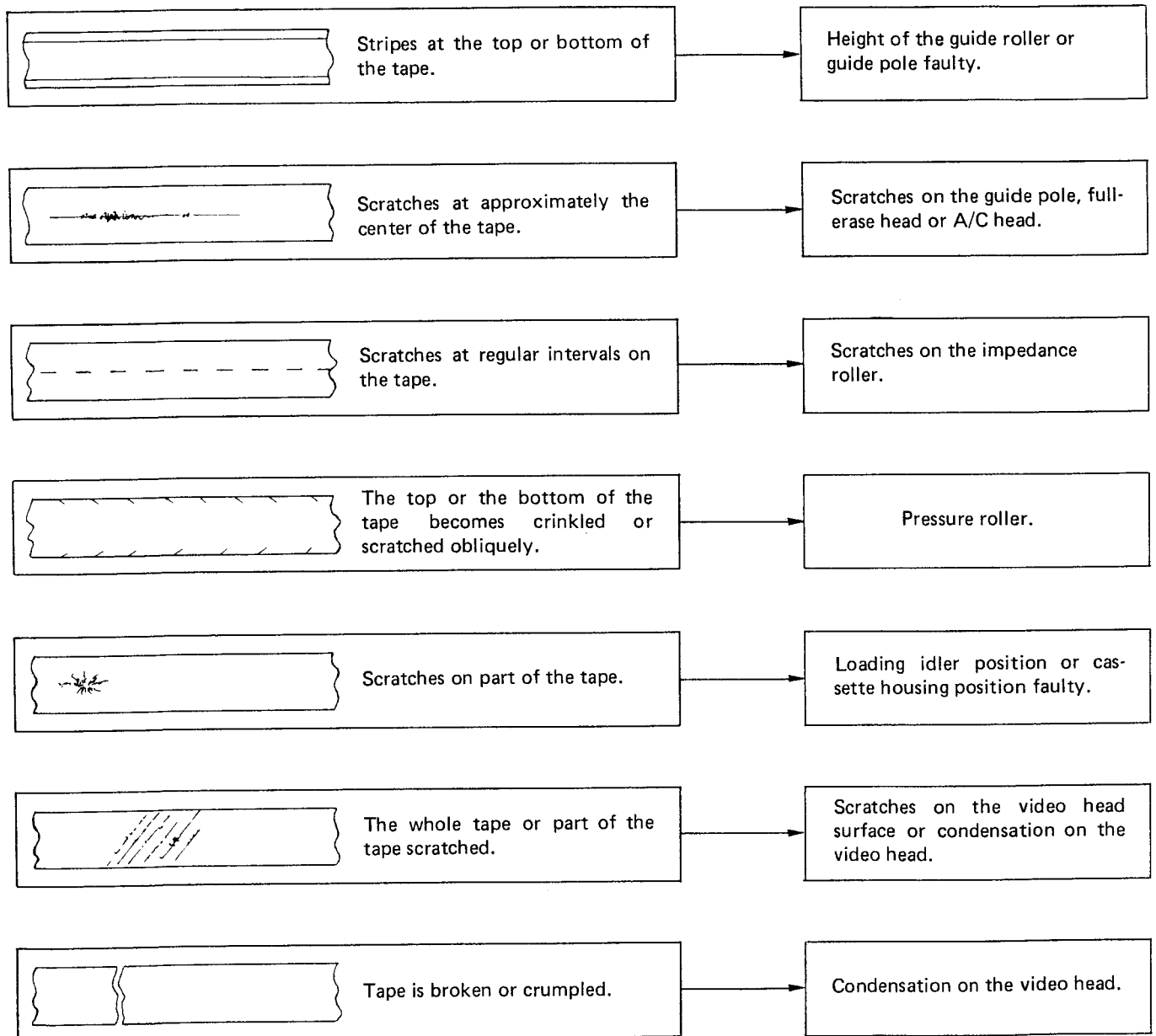
	Cause	Remedy	Remarks
1	Tuner-adaptor contact faulty	Replace or resolder	

1-6 Enters the charge mode with the battery power set to ON.

	Cause	Remedy	Remarks
1	D705 faulty	Replace	

2. MECHANICAL SYSTEM

2-1. Damaged or broken tape



2-2 Counter does not turn

	Cause	Remedy	Remarks
1	Belt slipped off	Reinstall belt	

2-3 Abnormal sound during FF operation

	Cause	Remedy	Remarks
1	Fixing counter faulty	Re-fix counter	

2-4 Cassette housing does not rise

	Cause	Remedy	Remarks
1	EJECT lever spring slipped off	Reinstall spring	

2-5 Handle stopper does not work

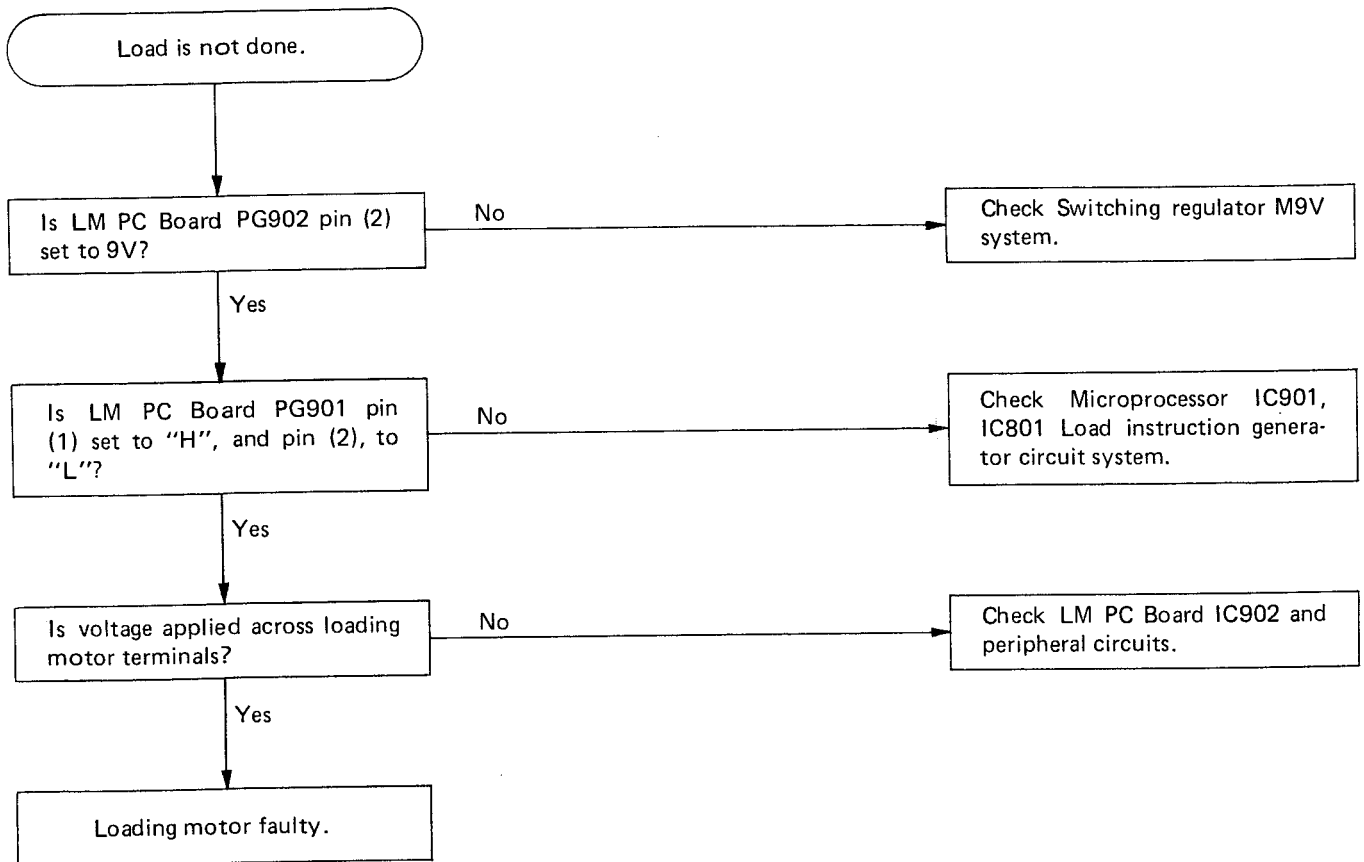
	Cause	Remedy	Remarks
1	Front panel stopper mold recess slipped off	Replace front panel	

2-6 Taking up tape is not possible

	Cause	Remedy	Remarks
1	Loading motor pulley caught	Re-wire	

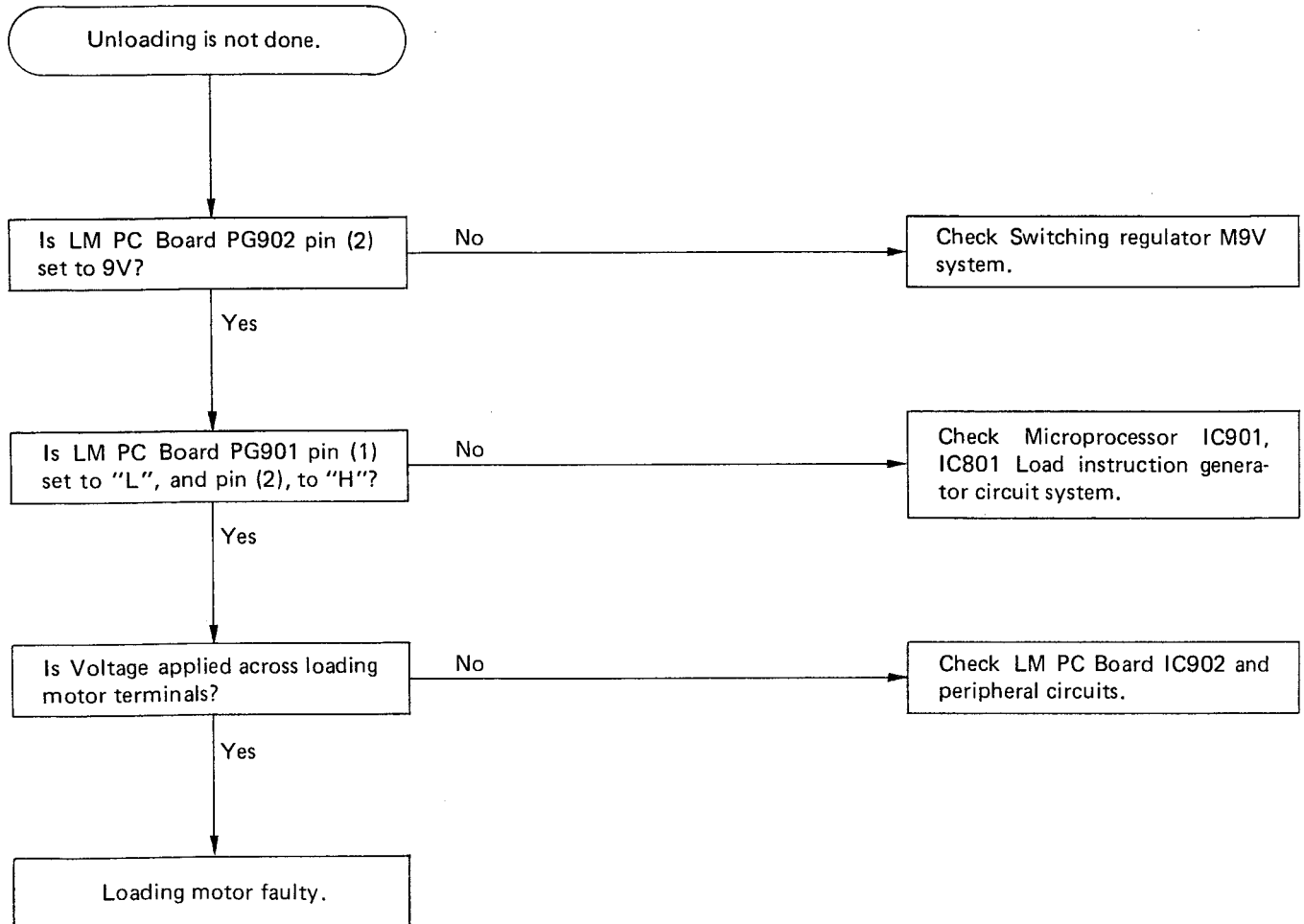
3. SYSTEM CONTROL SYSTEM

3-1. Loading is not done

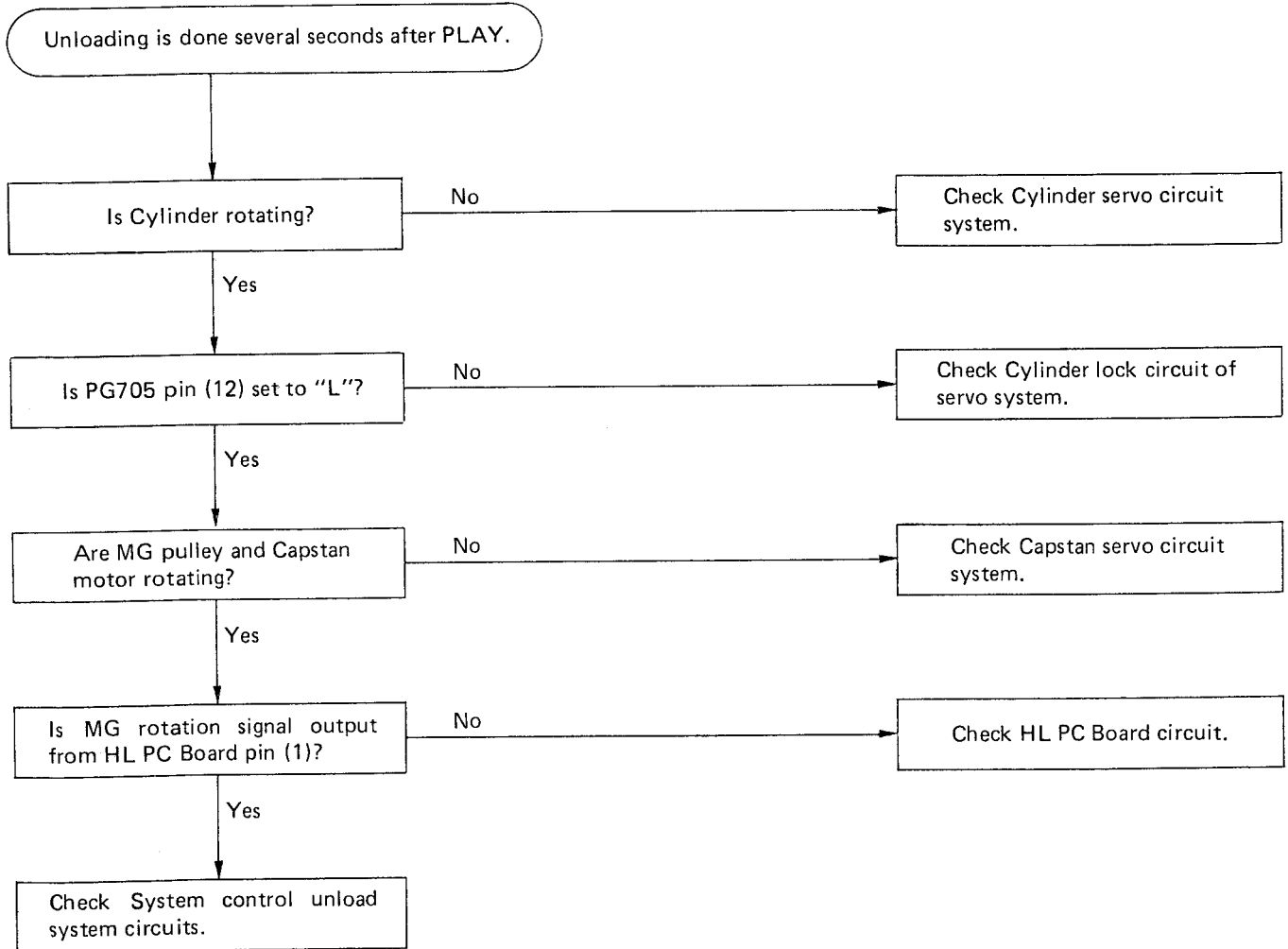


	Cause	Remedy	Remarks
1	M9V is not output from the regulator PC Board	Replace regulator	
2	Loading motor faulty	Replace motor	
3	Contact of loading motor drive PC Board	Reinsert	
4	Soldering IC801 (51) faulty	Resolder	
5	IC902 TA4309 faulty	Replace	

3-2. Unloading is not done

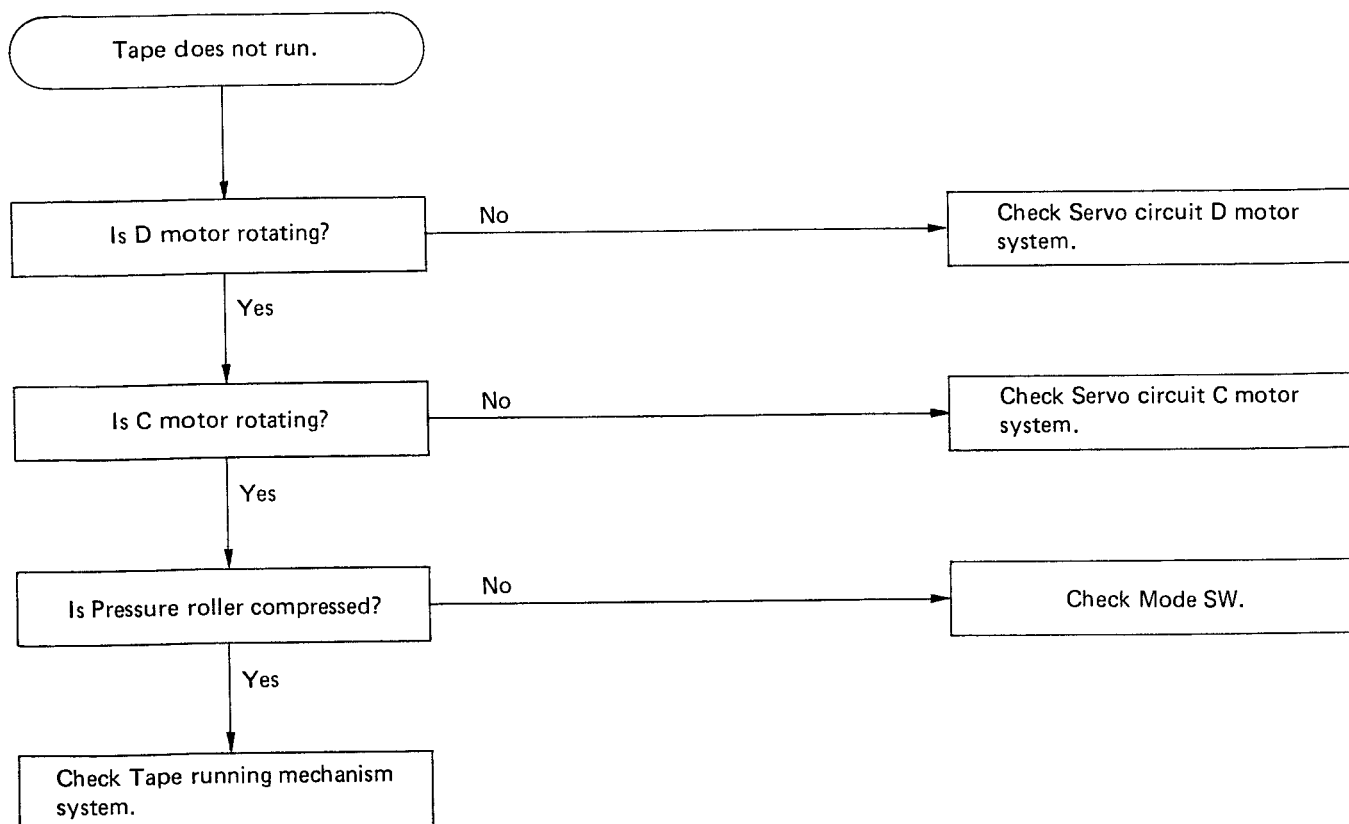


3-3. Unloading is done several seconds after PLAY



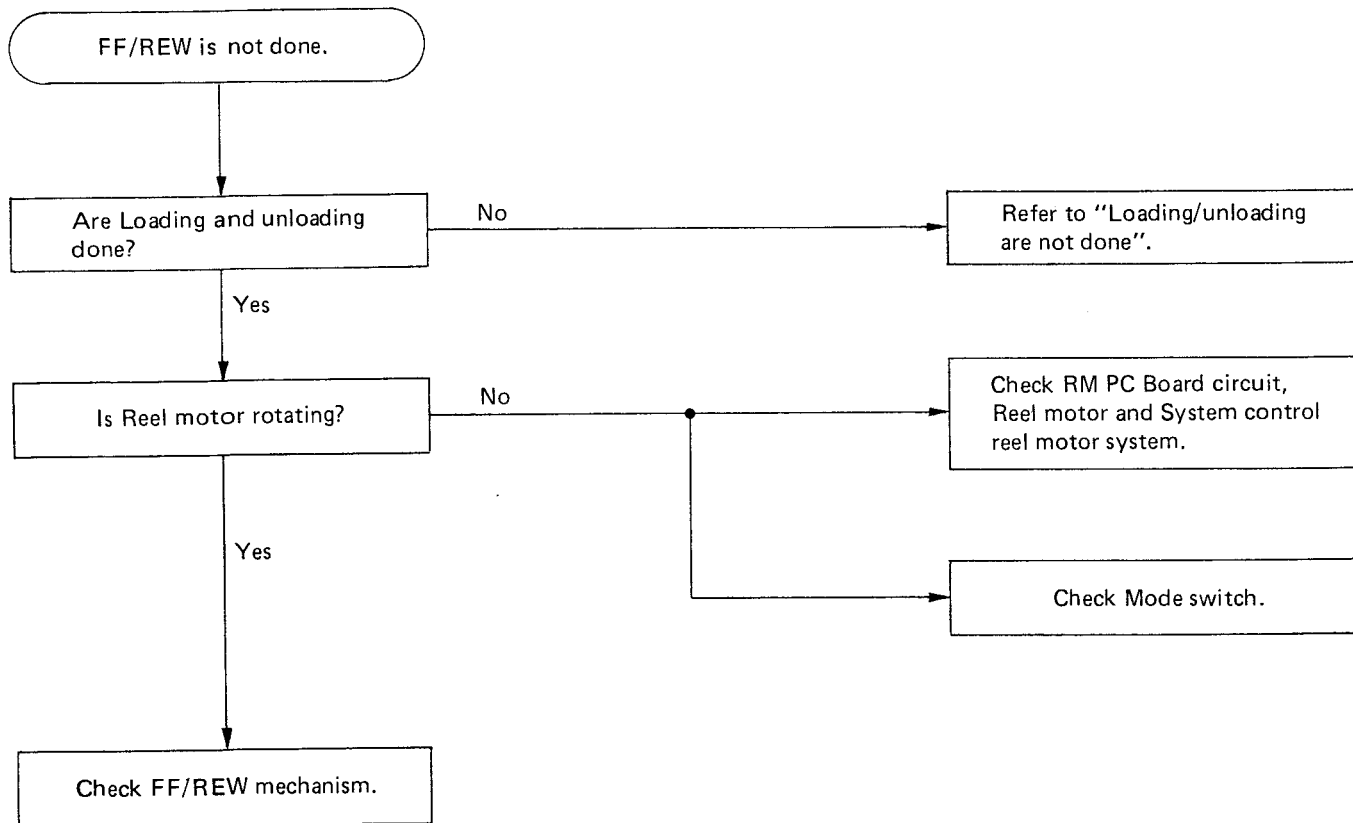
	Cause	Remedy	Remarks
1	Pattern incorrect between SYC PC Board IC809 pins (4), (6) and PG801 (B) (2/2)	Replace SYC PC Board	
2	Soldering PG810 (3) faulty	Resolder	
3	PG817 (2), (3) contact faulty	Reinsert	
4	Soldering IC801 (52) faulty	Resolder	
5	Magnet pulley slipped off	Replace	

3-4. Tape does not run



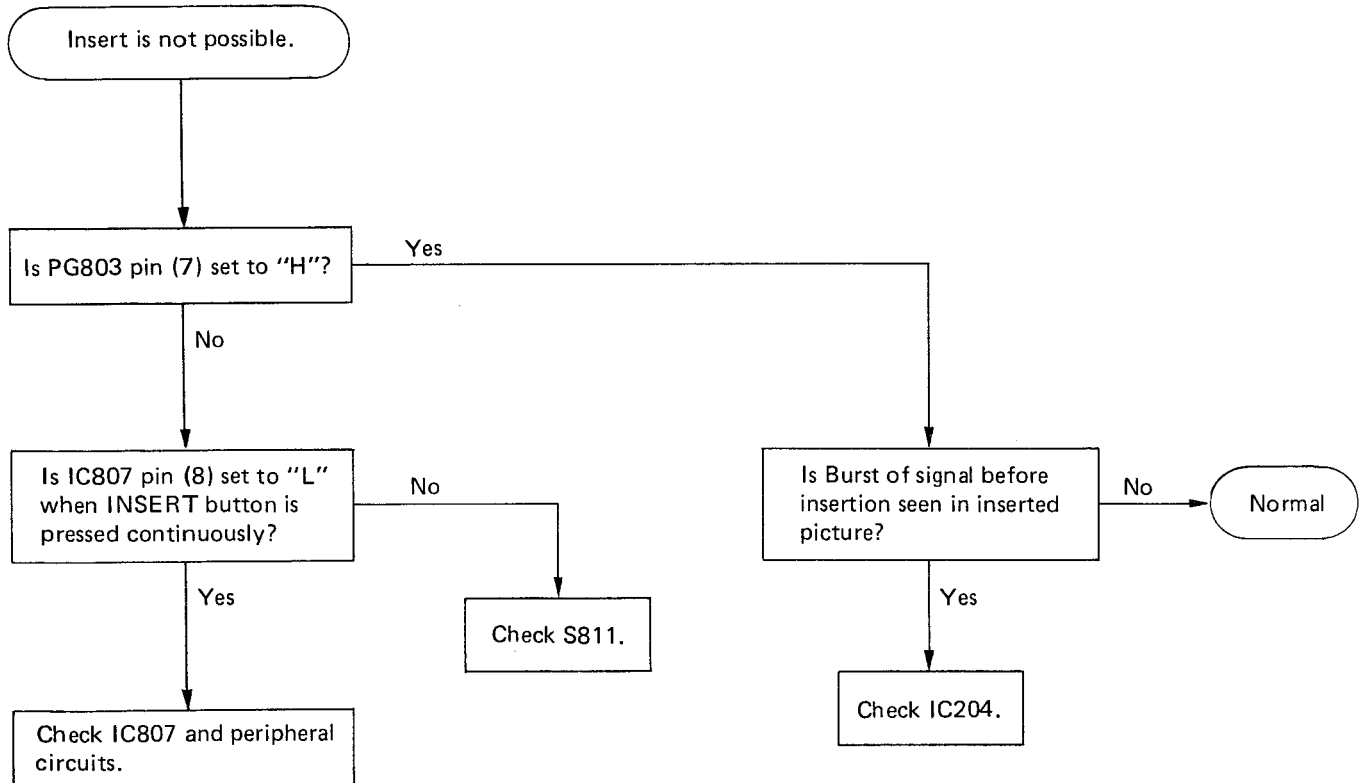
	Cause	Remedy	Remarks
1	Regulator output is not present	Replace regulator	
2	Soldering IC810 faulty	Resolder	
3	Cylinder motor drive PC Board IC682 HA11715 faulty	Replace IC	
4	Loading motor drive PC Board IC902 TA4309 faulty	Replace IC	
5	SYC PC Board IC801 faulty	Replace SYC PC Board	
6	IC501 HA11727 faulty	Replace IC	
7	IC903 DM101A faulty	Replace IC	
8	Q502 2SC202 faulty	Replace transistor	
9	D514 1S2473 faulty	Replace diode	
10	Loading motor faulty	Replace motor	
11	Q507 2SC2021 faulty	Replace transistor	
12	Regulator (7) contact faulty	Resolder	
13	RF converter faulty	Replace converter	
14	Mechanism stage sensor SW PC Board position drifted	Correct position	
15	Capstan motor faulty	Replace motor	
16	Oscillator does not oscillate 4.43 MHz in IC203	Replace IC	

3-5. FF/REW is not done



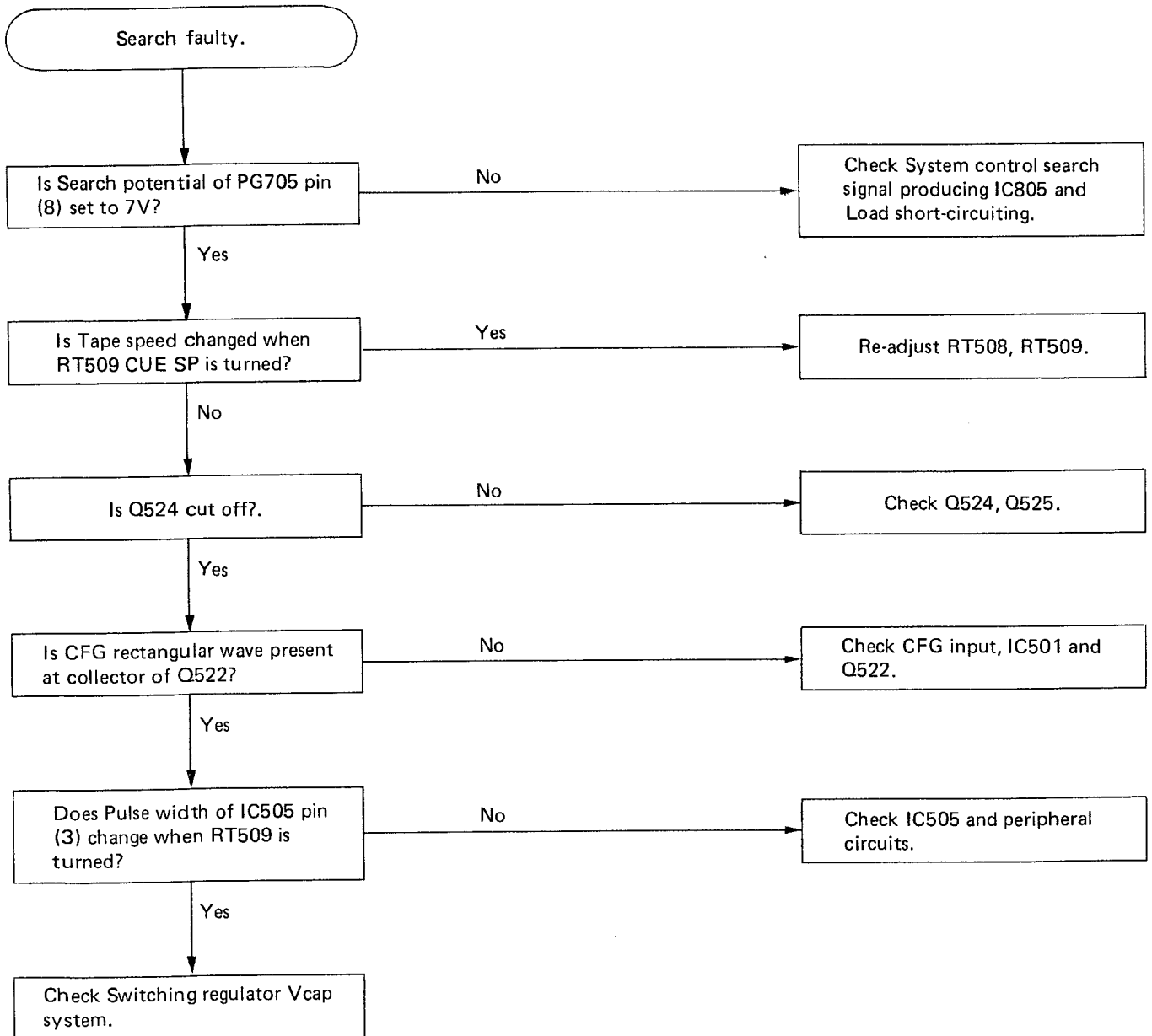
	Cause	Remedy	Remarks
1	Reel motor faulty	Replace motor	
2	Regulator faulty	Replace regulator	
3	SYC IC810 TA4313A faulty	Replace IC	
4	PG804 contact faulty	Reinsert	
5	IC901 TA4310 faulty	Replace IC	

3-6. INSERT is not possible

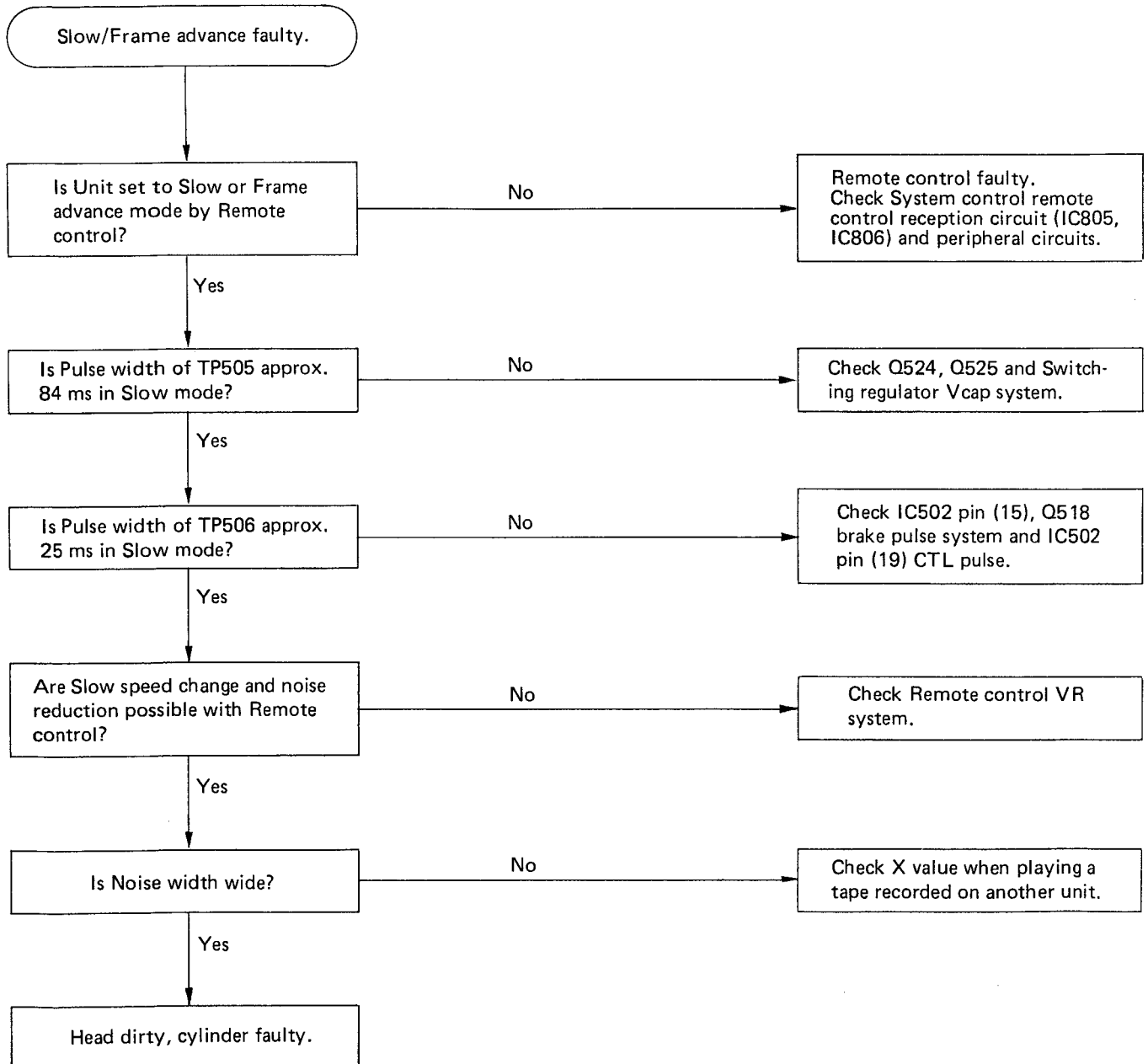


	Cause	Remedy	Remarks
1	SYC IC807 μ P D4011 faulty	Replace IC	
2	SYC C810 50V/1 μ F faulty	Replace capacitor	
3	D820 pattern touching	Resolder	
4	Soldering SYC IC801 pin (12) faulty	Resolder	
5	Burrs on INSERT button	Remove Burrs	

3-7. Search faulty (Cue, Rev)



3-8. SLOW/FRAME ADVANCE faulty



3-9. Loading stops intermittently

	Cause	Remedy	Remarks
1	Foreign matter is present in the brake slider	Remove foreign matter	

3-10. Reversing occurs with INSERT

	Cause	Remedy	Remarks
1	Servo PC Board Q708 2SA673C faulty	Replace transistor	
2	Servo PC Board C552 3.3 μ F/50V leaks	Replace capacitor	

3-11. Supply-reel turns with power ON

	Cause	Remedy	Remarks
1	Soldering SYC PG810 (4) faulty	Resolder	
2	SYC IC902 TA4309 faulty	Replace IC	
3	SYC IC810 TA4313A faulty	Replace IC	
4	Soldering SYC IC801 pin (22) loose	Resolder	

3-12. Cylinder turns with power ON

	Cause	Remedy	Remarks
1	IC809 PD4049 faulty	Replace IC	
2	B801 (9) solder touching	Resolder	

3-13. Power turned OFF with FF - REW - STOP

	Cause	Remedy	Remarks
1	Over-discharge level too low	Adjust to $11 \pm 0.05V$ using RT801	

3-14. Cylinder does not turn

	Cause	Remedy	Remarks
1	Soldering SYC IC809 pin (6) faulty	Resolder	
2	Servo PC Board D509 faulty	Replace diode	
3	IC501 HA11727 faulty	Replace IC	

3-15. Remote control does not operate

	Cause	Remedy	Remarks
1	J801 faulty	Replace	
2	Remote control cord disconnected	Replace	

3-16. Does not enter STOP and SLOW modes from remote control

	Cause	Remedy	Remarks
1	IC805 TA4168 faulty	Replace IC	

3-17. Power switched off during operation

	Cause	Remedy	Remarks
1	IC805 TS4168 faulty	Replace IC	

3-18. DUB lamp lights with power ON

	Cause	Remedy	Remarks
1	SYC IC801 HD44820A-17 faulty	Replace IC or PC Board	

3-19. STOP lamp flashes

	Cause	Remedy	Remarks
1	IC806 MB4204 faulty	Replace IC	

3-20. DUB lamp lights due to shock

	Cause	Remedy	Remarks
1	Soldering SYC D801 loose	Resolder	

3-21. Timer-recording is not released

	Cause	Remedy	Remarks
1	Tuner/adaptor faulty	Resolder or replace	

3-22. Does not enter PAUSE mode when camera is connected

	Cause	Remedy	Remarks
1	Camera connector (+) pin pattern faulty	Resolder	

3-23. Battery meter drifted

	Cause	Remedy	Remarks
1	Adjustment drifted	Adjust over-discharge level	

3-24. Picture disappear in PAUSE mode

	Cause	Remedy	Remarks
1	SYC B801 (6), (7) solder touching	Resolder and correct	

3-25. Does not enter PAUSE mode

	Cause	Remedy	Remarks
1	SYC IC801 HD44820A-17 faulty	Replace IC or PC Board	
2	Servo PC Board IC502 BA847 faulty	Replace IC	

3-26. END detection not possible in REC mode

	Cause	Remedy	Remarks
1	Supply end sensor slipped off	Fix sensor with BOND	

3-27. SEARCH operation is not done

	Cause	Remedy	Remarks
1	SYC IC808 μ PD4555 faulty	Replace IC	
2	SYC PG802 contact faulty	Reinsert	

3-28. Battery meter cannot be adjusted

	Cause	Remedy	Remarks
1	SYC PG801B (2/2) faulty	Replace diode	
2	Battery meter faulty	Replace meter	

3-29. Tape does not travel when the unit is used on color TV (CA-554) (tape travels when it is used away from color TV)

	Cause	Remedy	Remarks
1	Horizontal pulse of color TV jumps into CFG of the capstan motor and the motor does not turn	CFG circuit Change Servo PC Board C570, 0.022→0.33 μ	

3-30. Does not stop with counter set to "999"

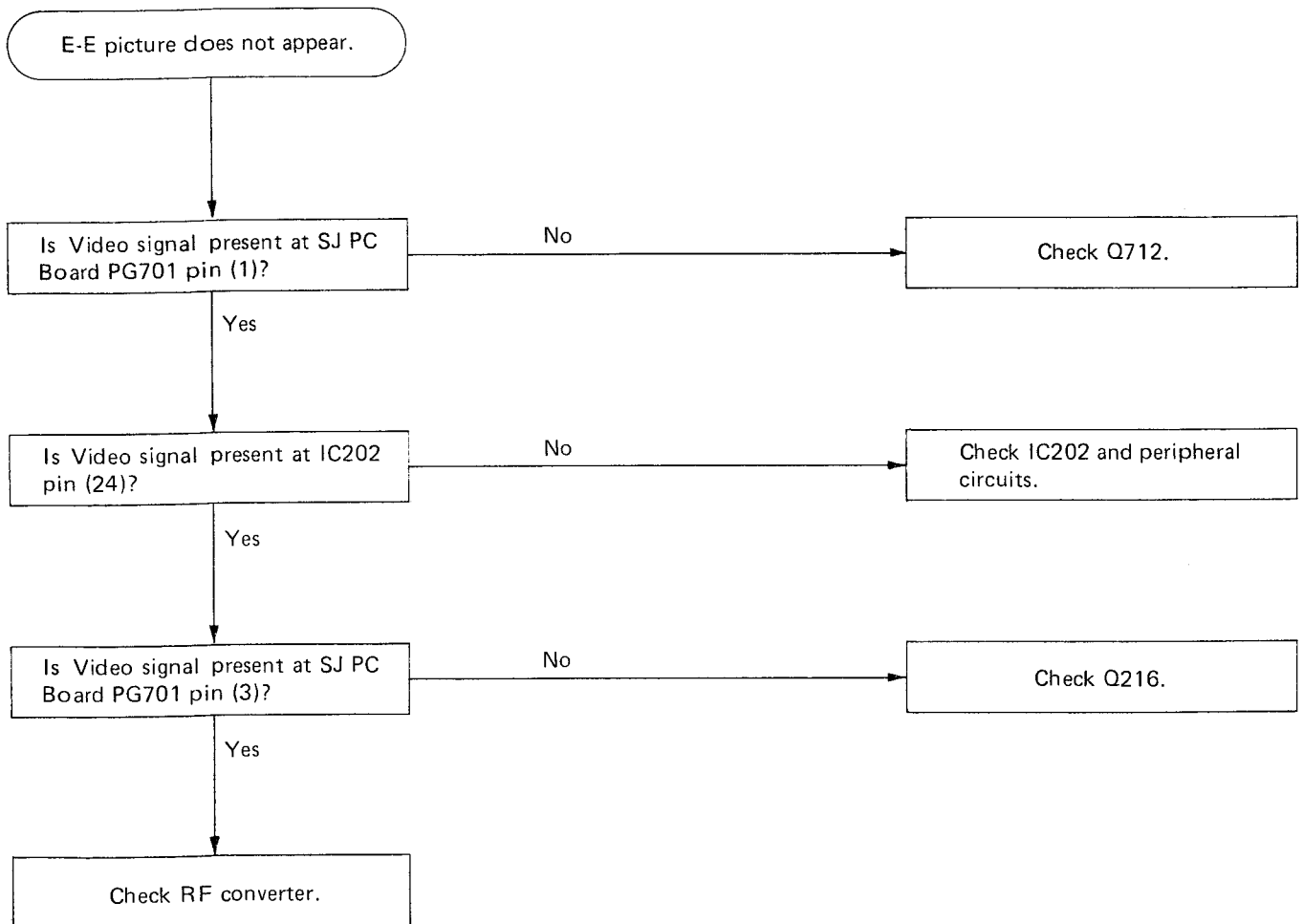
	Cause	Remedy	Remarks
1	SYC PG811 contact faulty	Reinsert	

3-31. Search, frame advance faulty

	Cause	Remedy	Remarks
1	SYC IC808 μ PD4555 faulty	Replace IC	

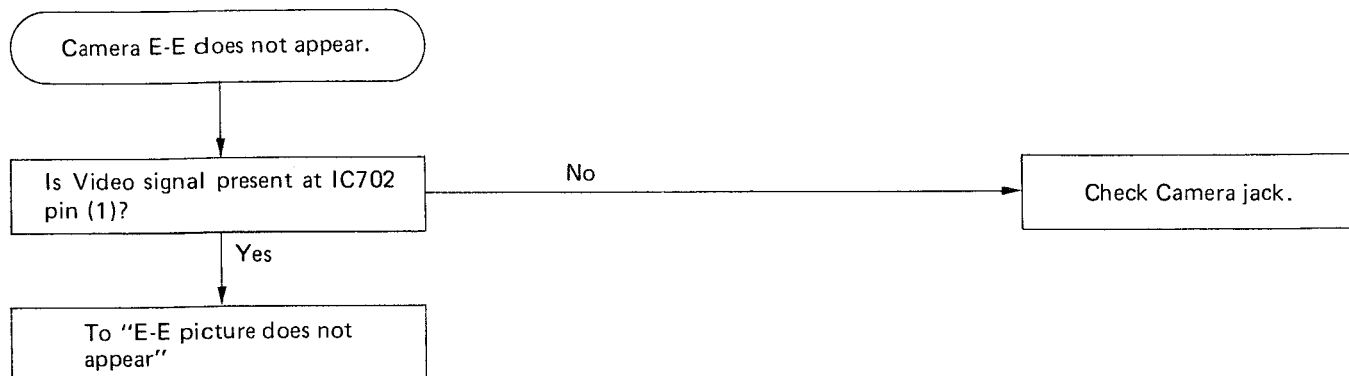
4. EE SYSTEM

4-1. E-E picture does not appear



	Cause	Remedy	Remarks
1	RF converter faulty	Replace RF converter	
2	WYC IC202 HT4218 faulty	Replace IC	
3	Q712 faulty	Replace transistor	

4-2. Camera E-E does not appear



	Cause	Remedy	Remarks
1	Servo IC702 TA4328 faulty	Replace IC	

4-3. EE level too low

	Cause	Remedy	Remarks
1	WYC IC202 HT4218 faulty	Replace IC	
2	Servo IC702 TA4328 faulty	Replace IC	

4-4. EE picture does not appear when shock is applied

	Cause	Remedy	Remarks
1	SW regulator faulty	Replace SW regulator	

4-5. Lamp (B) flashes when camera is connected

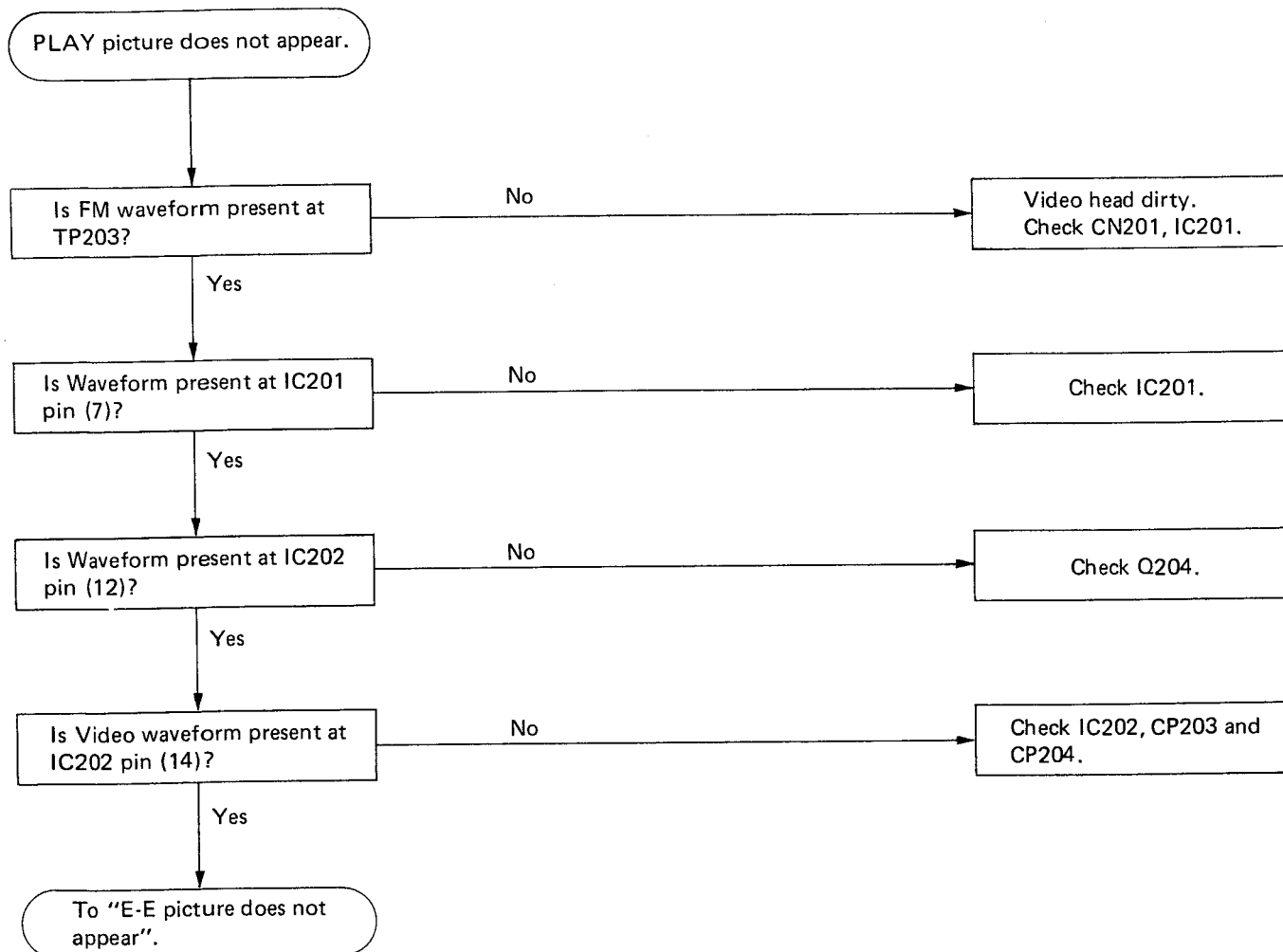
	Cause	Remedy	Remarks
1	SYC IC803 TA4312A faulty	Replace IC	

4-6. Right-down beat noise appears on the screen

	Cause	Remedy	Remarks
1	Jumping from SW regulator	Move the 12V input line (violet) of the regulator from the parts side to the pattern side	

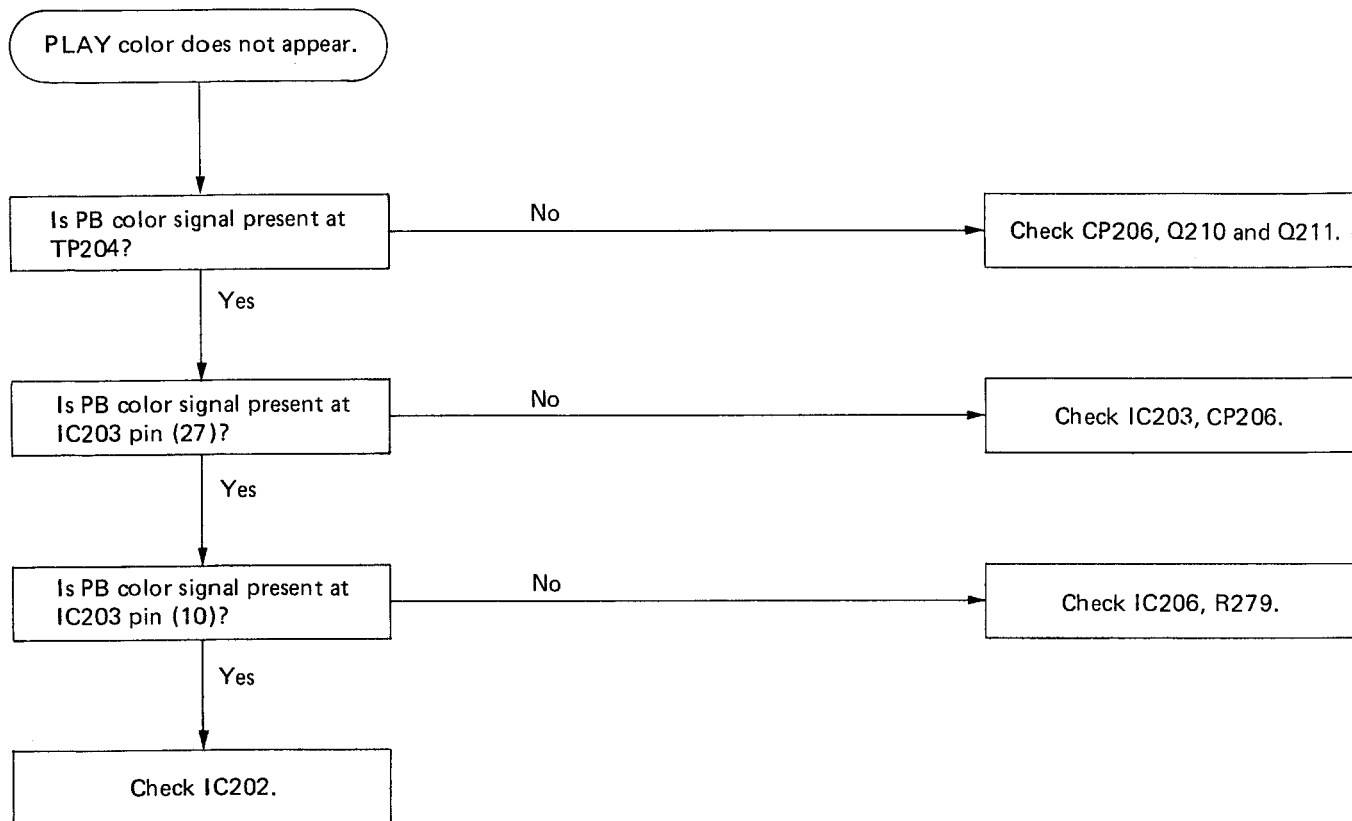
5. PLAY SYSTEM

5-1. PLAY picture does not appear



	Cause	Remedy	Remarks
1	Video head faulty	Replace head	
2	Video head dirty	Clean head	
3	WYC IC201 HA11724 faulty	Replace IC	
4	WYC IC202 HT4218 faulty	Replace IC	
5	WYC IC202 (12), (13) loose solder	Resolder and correct	
6	WYC IC201 (20) loose solder	Resolder and correct	
7	DL202 faulty	Replace filter	

5-2. PLAY color does not appear



	Cause	Remedy	Remarks
1	WYC IC203 TA4219 faulty	Replace IC	
2	WYC CP202 faulty	Replace filter	

5-3. Play picture quality faulty

	Cause	Remedy	Remarks
1	Video head faulty	Replace head	
2	WYC IC201 HA11724 faulty	Replace IC	
3	Tracking VR position faulty	Adjust tracking	
4	Servo IC505 μ PD4011C faulty	Replace IC	
5	Switching point drifted	Adjust	
6	X value drifted	Adjust	
7	Soldering CP202, DL202, faulty or parts faulty	Resolder and correct or replace	

5-4. Horizontal black noise occurs when the tapes which were recorded on this unit or another unit are played back

	Cause	Remedy	Remarks
1	Foreign matter such as magnetic powder, etc. adhere to the tape transport system (especially full erase head), and is magnetized and demagnetized	Clean the tape transport system	

5-5. Black and white inverted

	Cause	Remedy	Remarks
1	Video head faulty	Replace head	
2	Tracking preset adjustment drifted	Adjust RT505 so that the FM envelope waveform is max.	

5-6. Color beat

	Cause	Remedy	Remarks
1	Jumping from the SW regulator	Same as Item 4-6	
2	WYC DL201 faulty	Replace delay line	

5-7. Play sync level too low

	Cause	Remedy	Remarks
1	WYC IC201 HA11724 faulty	Replace IC	

5-8. Drum servo faulty

	Cause	Remedy	Remarks
1	Servo IC501 HA11727 faulty	Replace IC	
2	Wire between drum tack head and servo PC Board disconnected	Rewire	
3	SYC B801 (1) contact faulty	Resolder	
4	SYC IC809 μ PD4049 faulty	Replace IC	

5-9. Noise cannot be reduced in fine slow

	Cause	Remedy	Remarks
1	FM output faulty	Replace and adjust	
2	Cylinder head faulty	Replace head	
3	RT510 adjustment drifted	Adjust	
4	RT511 adjustment drifted	Adjust	

5-10. Capstan servo faulty

	Cause	Remedy	Remarks
1	Capstan motor faulty	Replace motor	
2	Servo D604 DAN201 faulty	Replace diode	
3	Servo Q511 2SC2021 faulty	Replace transistor	
4	IC501 faulty	Replace IC	
5	Solder touching	Resolder	
6	D519, D520 faulty	Replace capacitors	
7	CN501 contact faulty	Correct	

5-11. SW25 does not come out

	Cause	Remedy	Remarks
1	Servo IC505 μ PD4011C faulty	Replace IC	

5-12. Play picture noise

	Cause	Remedy	Remarks
1	Guide roller position drifted	Adjust	
2	Cylinder dirty	Clean it	

5-13. PLAY picture S/N faulty

	Cause	Remedy	Remarks
1	Upper cylinder faulty	Replace	
2	C257 loose solder	Resolder and correct	

5-14. Play picture fluctuates

	Cause	Remedy	Remarks
1	Tuner/adaptor contact faulty	Resolder to correct or replace	

5-15. Play picture abnormal

	Cause	Remedy	Remarks
1	IC501 faulty	Replace	
2	Tach pulse does not come out	Replace Q507	
3	Back-tension faulty	Adjust	

5-16. EE picture during play

	Cause	Remedy	Remarks
1	IC809 faulty	Replace	

5-17. Still picture fluctuates

	Cause	Remedy	Remarks
1	R280 adjustment drifted	Adjust	

5-18. Abnormal sound during play

	Cause	Remedy	Remarks
1	IC401 faulty	Replace	

5-19. Electrostatic noise during play

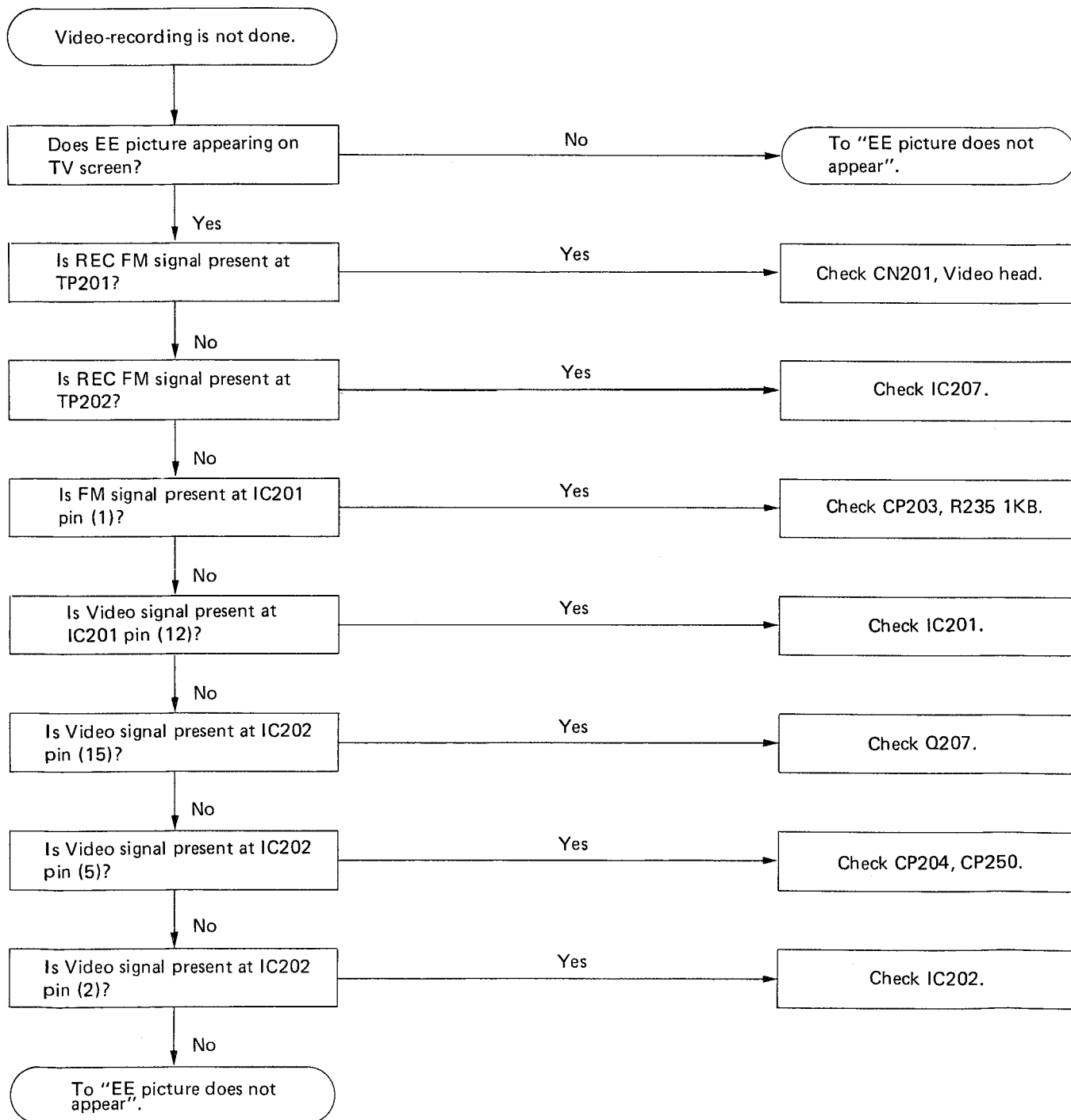
	Cause	Remedy	Remarks
1	Lower cylinder faulty	Replace	

5-20. Horizontal stripes appear on the monitor when battery is used

	Cause	Remedy	Remarks
1	D806 and collector of Q808 touching and short-circuited	Correct it	

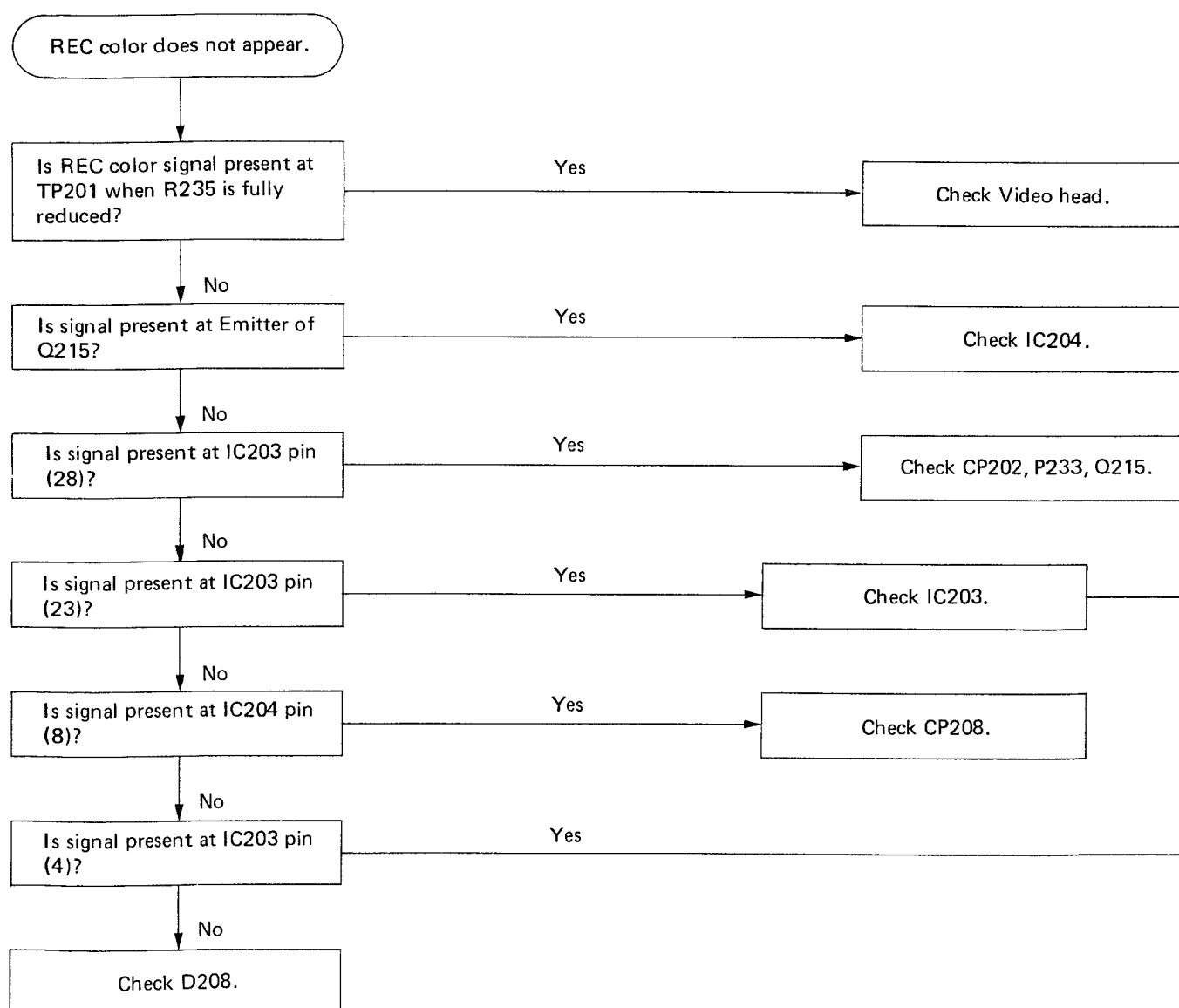
6. RECORDING SYSTEM

6-1. Video-recording is not done



	Cause	Remedy	Remarks
1	Video head faulty	Replace DD cylinder head	
2	Head dirty	Clean head	
3	Head lead wire touches GND	Correct wiring	
4	Q205, Q206 faulty	Replace transistor	

6-2. REC color does not appear



	Cause	Remedy	Remarks
1	WYC IC203 faulty	Replace IC	

6-3. REC FM level too low

	Cause	Remedy	Remarks
1	WYC IC202 HT4218 faulty	Replace	
2	WYC CP202 faulty	Replace high-pass filter	

6-4. Noise occurs during recording

	Cause	Remedy	Remarks
1	Capstan motor faulty	Replace motor	

6-5. Color level too low

	Cause	Remedy	Remarks
1	WYC CP208 faulty	Replace band pass filter	
2	WYC IC203 HT4219 faulty	Replace IC	

6-6. Color noise occurs

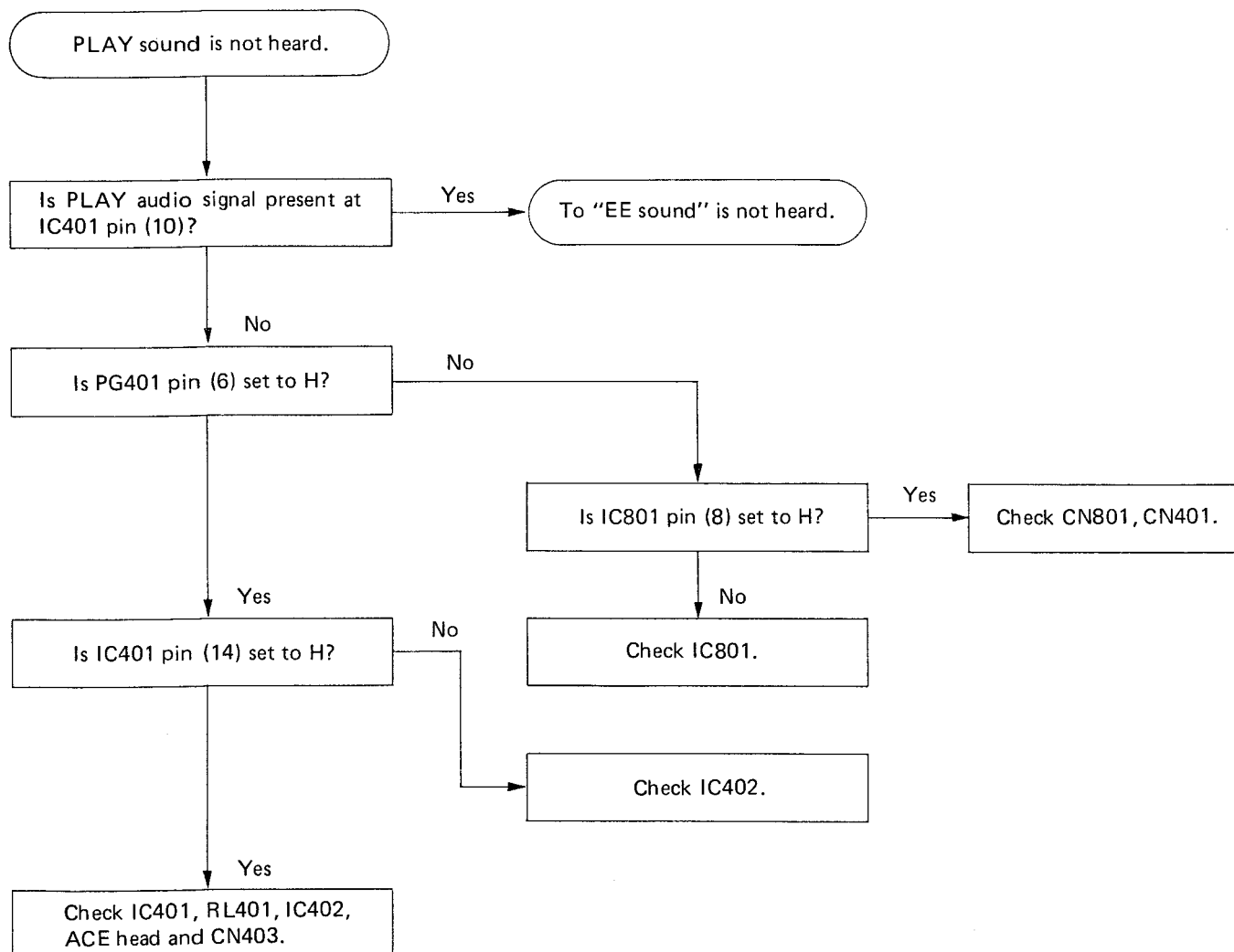
	Cause	Remedy	Remarks
1	CP207 faulty	Replace filter	
2	Erase head lead wire contact faulty	Correct it	

6-7. TV recording is not possible

	Cause	Remedy	Remarks
1	Tuner/adaptor faulty	Replace	

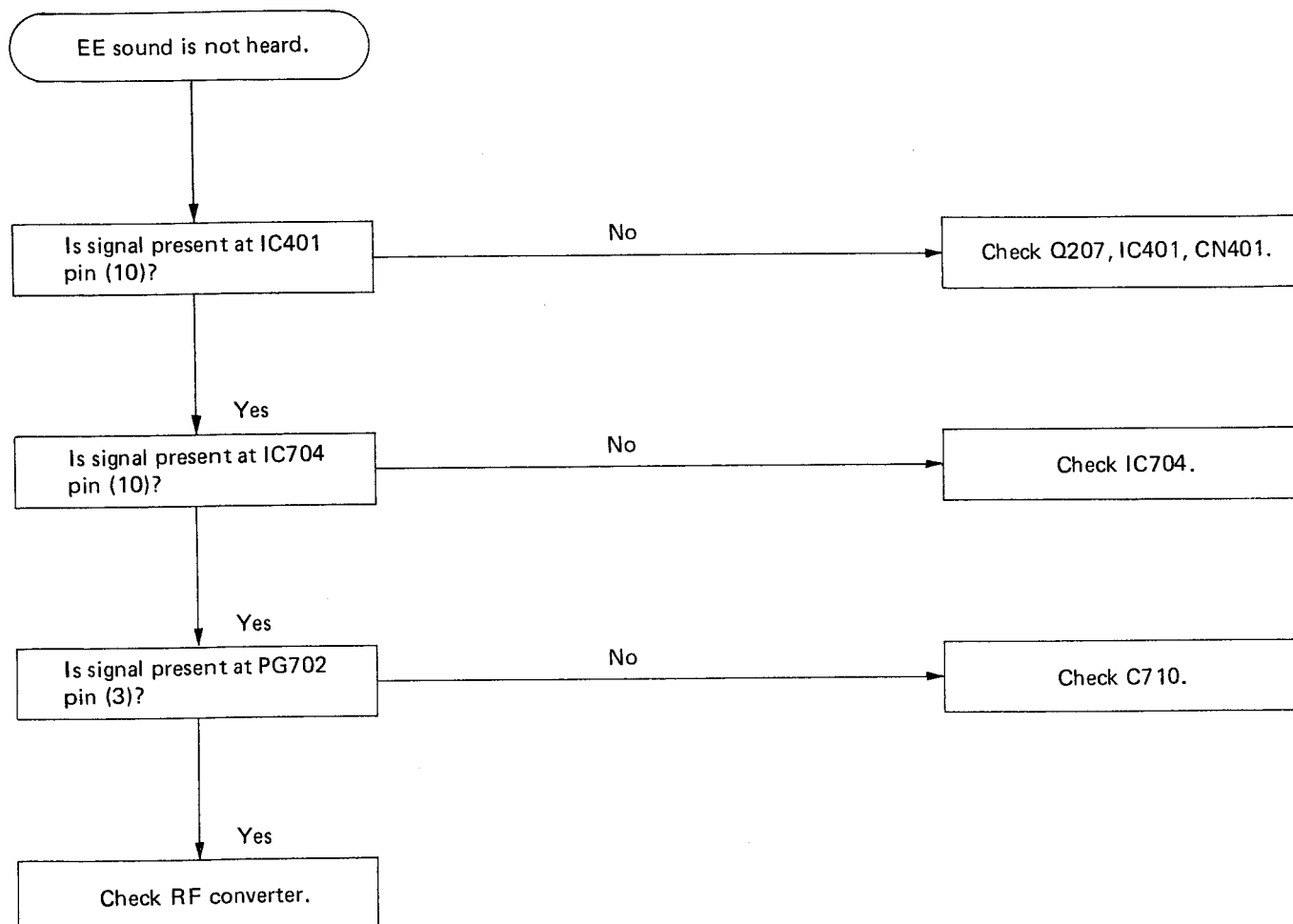
7. AUDIO SYSTEM

7-1. PLAY sound is not heard



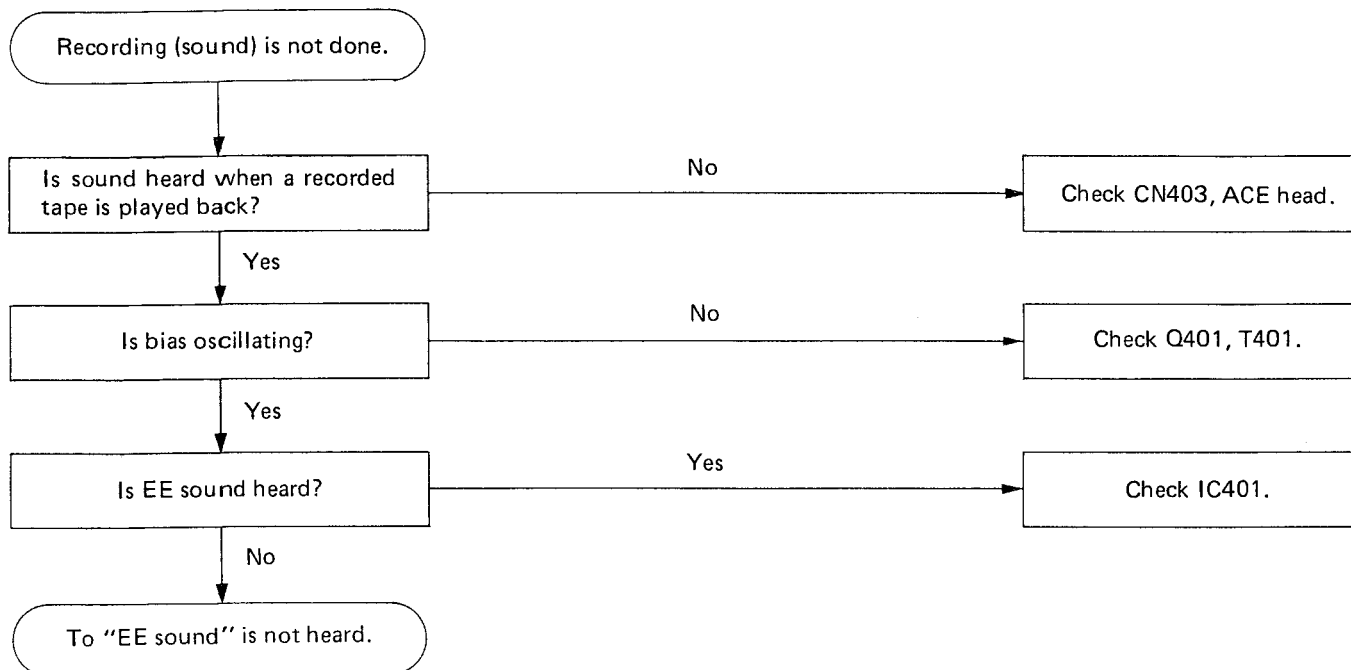
	Cause	Remedy	Remarks
1	Audio RL401 contact faulty	Reinsert and correct	
2	SOUND-ON-SOUND S810 faulty	Replace	
3	A/C head faulty	Replace head	
4	Mic jack solder loose	Resolder	
5	Audio IN input loose solder	Resolder and correct	

7-2. EE sound is not heard



	Cause	Remedy	Remarks
1	IC401 (18) and C401 (+) terminal lead touch	Correct it	
2	Servo PG703 contact faulty	Reinsert and correct	
3	SYC IC804 (12), (15) touch pattern	Correct patterns or replace PC Board	

7-3. Recording (sound) is not done



7-4. Abnormal sound during play

	Cause	Remedy	Remarks
1	Erase head lead wire loose solder	Resolder and correct	

7-5. SOUND-ON-SOUND recording not possible (Same for distortion)

	Cause	Remedy	Remarks
1	Bias adjustment faulty	Adjust Audio RT404 to $1.5 \text{ mV} \pm 0.05$	
2	RT404 faulty	Replace VR	

7-6. Audio WOW

	Cause	Remedy	Remarks
1	Capstan motor faulty	Replace motor	

7-7. Sound is not changed over in the PLAY mode

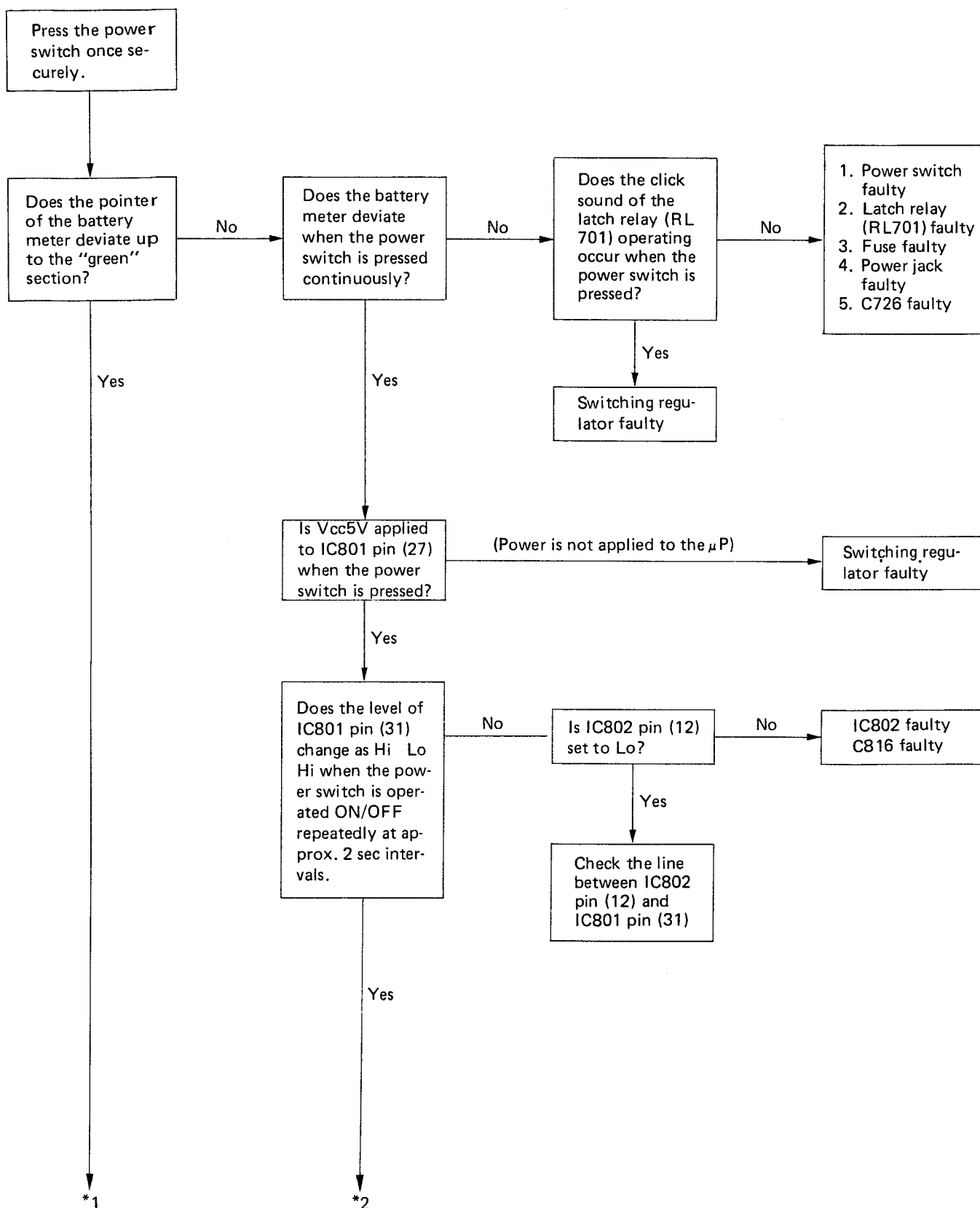
	Cause	Remedy	Remarks
1	Short-circuited between SYC IC809 (15) and PG801 (B), IC809 (12) and PG801 (B)	Replace PC Board	

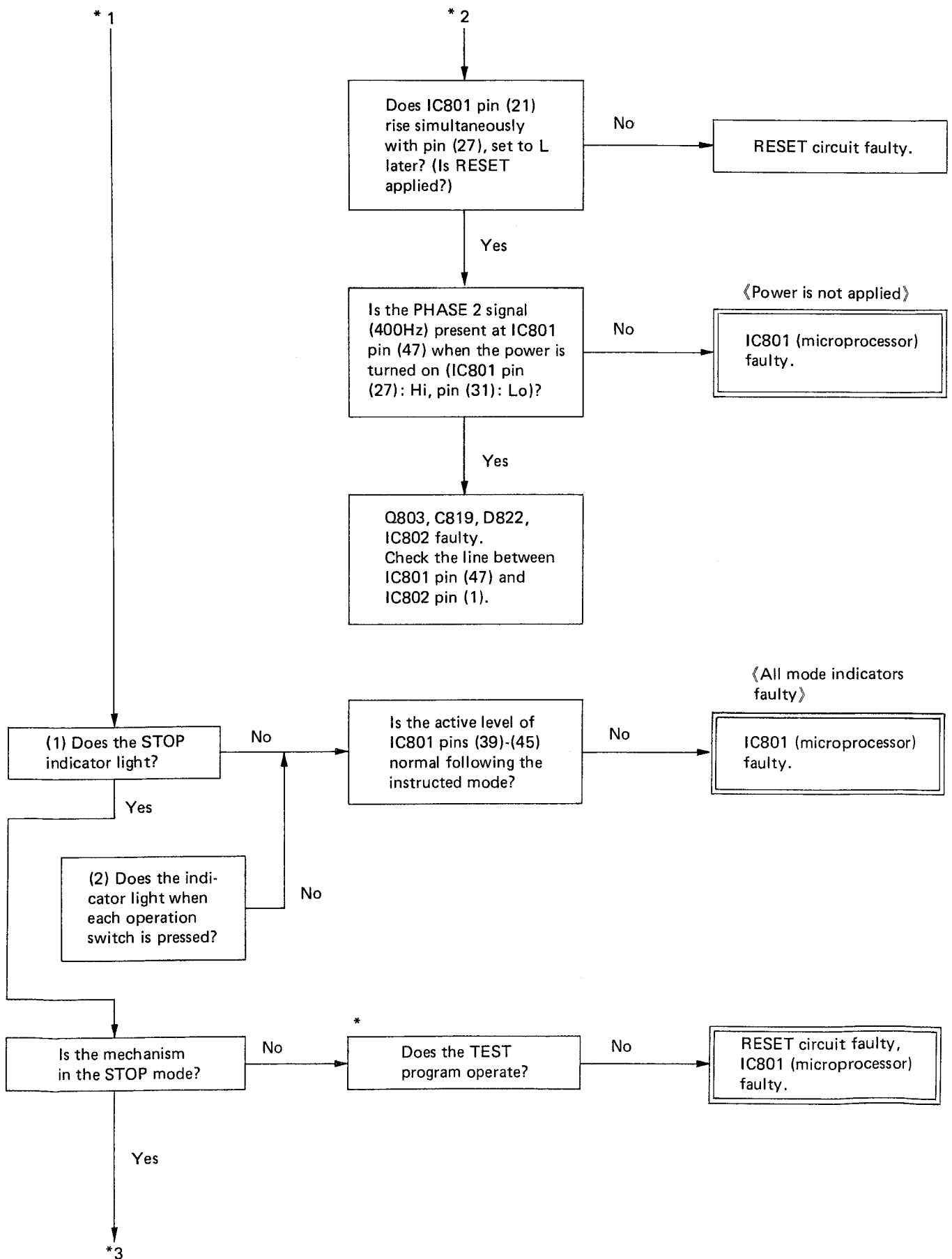
7-8. Record sound cannot be erased by audio dubbing

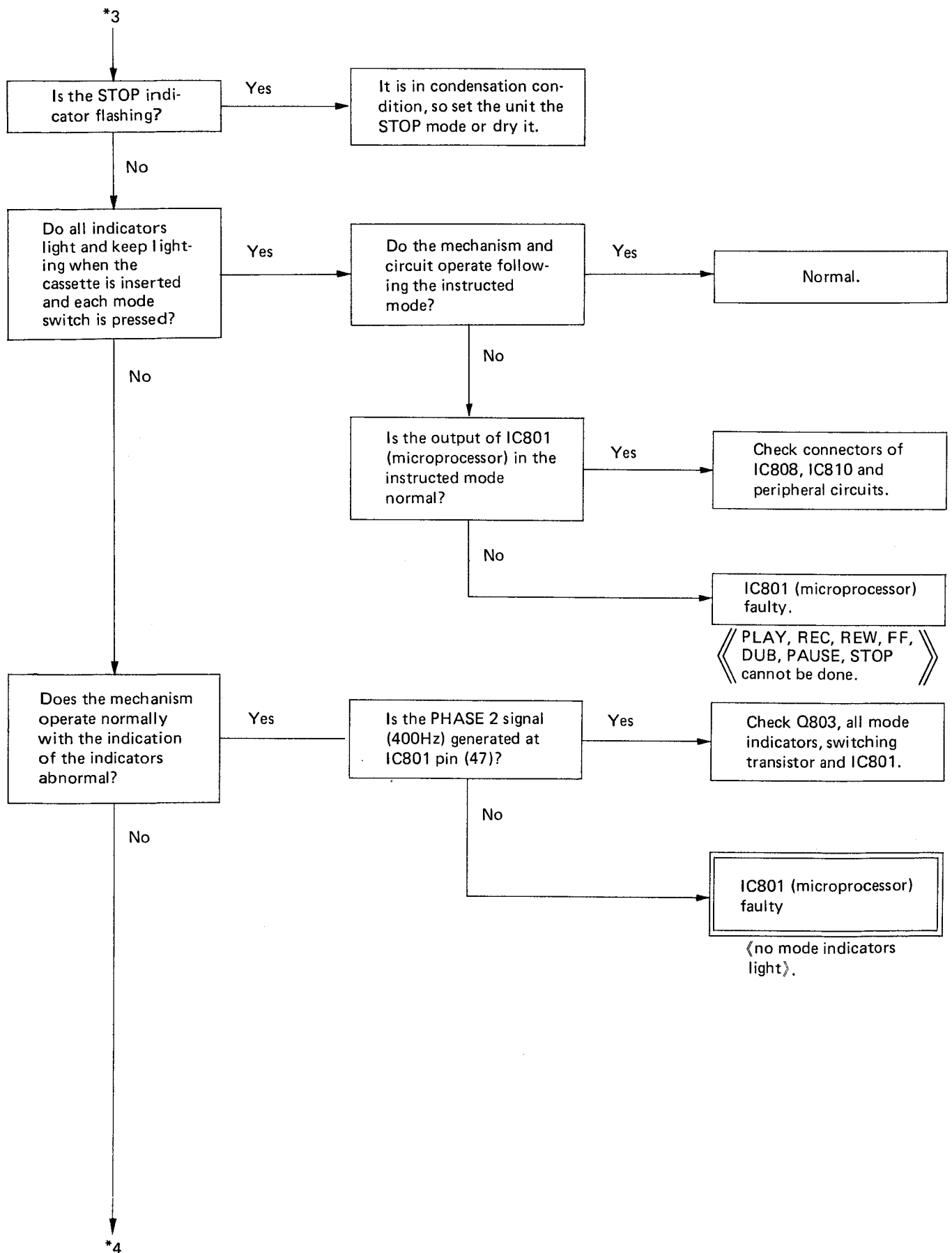
	Cause	Remedy	Remarks
1	PG451 contact faulty	Reinsert and correct	

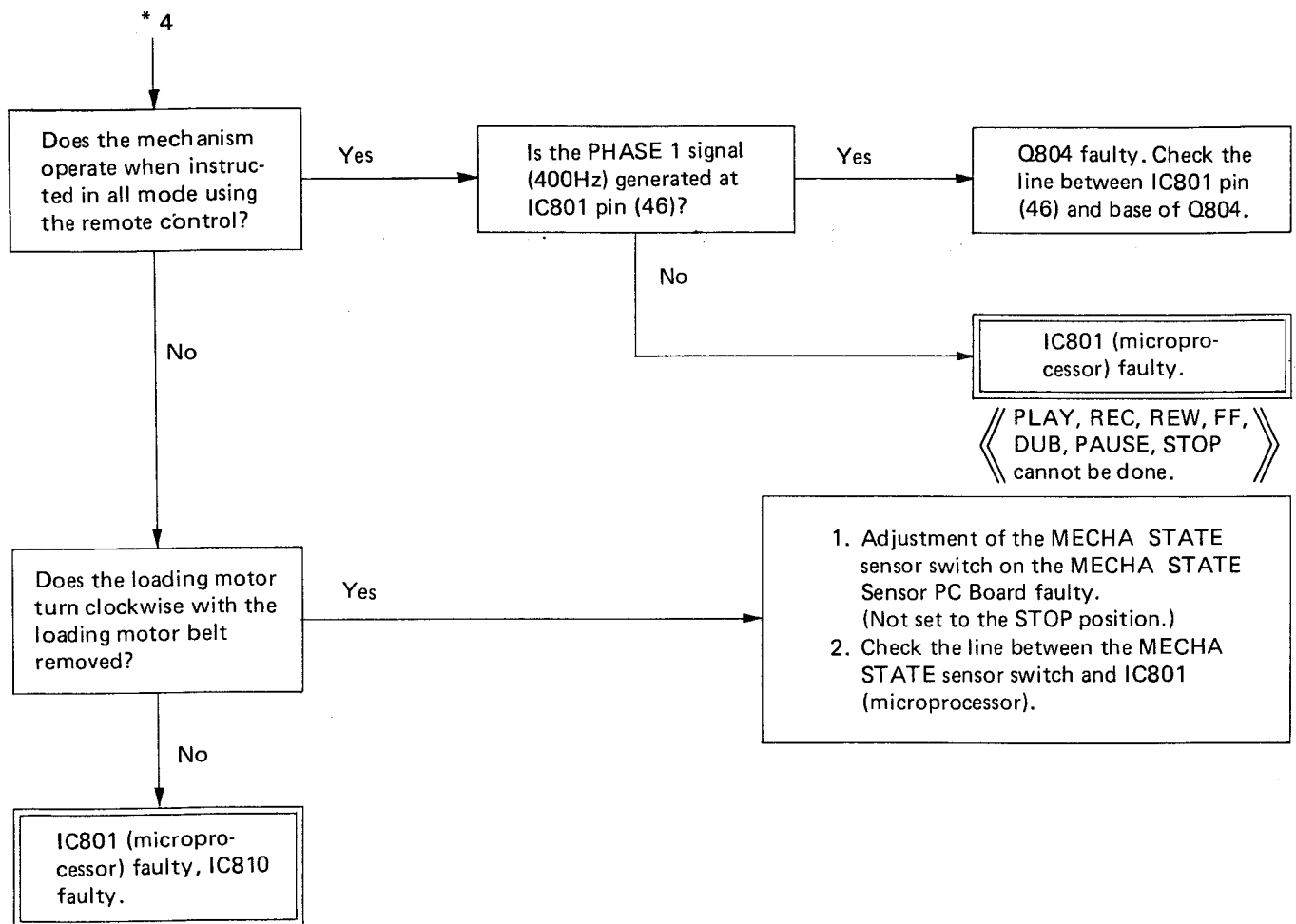
III. μ P TROUBLE-SHOOTING

Note Connect the power (battery VT-BP60), power adaptor and the video electronic tuner (VT-TV65) to the set first. The power voltage at that time should be 11.2V or more.









***TEST program operation method**

Open the cassette holder, set the safety tab switch to ON (REC possible) and then repeat the ON/OFF operation of the power switch: All the mode indicators should light simultaneously for approx. 0.3 sec.

However, the TEST program does not operate when ESS, EST, PHASE 1, sensor LED, Tab SW and Stage SW are not normal.